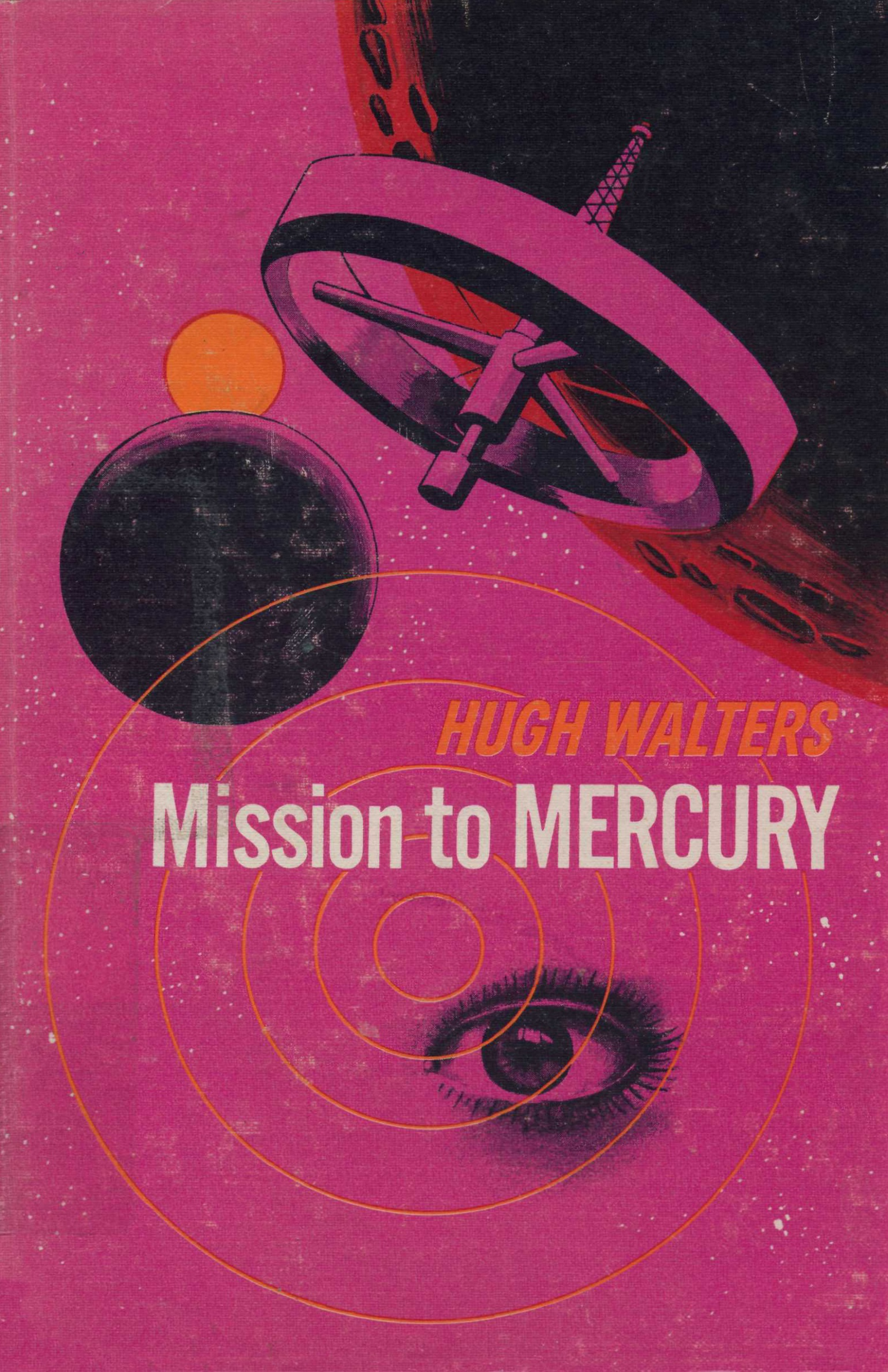

HUGH WALTERS

Mission to MERCURY

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MISSION

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BY HUGH WALTERS

TO MERCURY

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MISSION TO MERCURY

1

"Can you remember what I said after your last expedition?" asked Sir George Benson, the Director of the United Nations Exploration Agency.

The famous scientist was in the office he used during his occasional visits to London and his question was addressed to the four young men facing him. To a casual observer they may have seemed just an attractive group, but a closer look would have revealed that they were the famous quartet of astronauts who had crewed the most exciting and dangerous missions ever dispatched by the Agency. Now they were waiting to hear from their friend and chief about their next assignment.

"Yes," replied one of them, Chris Godfrey, "you said something about Mercury, didn't you?"

An observer would have noticed Chris first, for he was the natural leader of the group. Of medium height, he had fair hair and gray eyes that could change in a flash from gay good humor to the hardness of steel. He was the most experienced space traveler of them all.

"Quite right," the Director of UNEXA answered with a twinkle in his eyes, "your next mission will be to that rather warm planet. But there was something else I mentioned. Have you forgotten?"

"Didn't you say we'd have another crew member?" the youngest of the four astronauts asked.

Tony Hale was the mechanic of the party. Though, to his subsequent regret, Tony had wasted some of his time at school, he had afterward developed extraordinary mechanical facility. He was the finest mechanic in any of the space crews, and on more than one occasion his practical skill had saved the lives of his more brilliant friends.

"You also mentioned a new means of communication," added Morrey Kant, the American. This tall, crew-cut young man with the perpetual grin and the shoulders of a football star looked keenly at Sir George.

"Didn't you also mention telepathy?" asked the fourth member of the team.

This was Serge Smyslov, a slim, dark Russian who was the most reserved member of the quartet. In the early days of space exploration, when there had been that senseless rivalry between East and West, Serge had been Chris Godfrey's greatest rival. But it was the friendship that had sprung up between these two young astronauts, after each had saved the other, that had led the way to the existing universal cooperation.

"So you hadn't forgotten," Benson said smiling. He was a tall man whose hair was almost white. Chris could remember when it had scarcely a tinge of gray, but the worries and tensions of Sir George's job had aged the brilliant scientist. His decisions often meant life or death to the men in space. He would go on for weeks almost without sleeping when a mission had reached a critical stage. Yet even the long hours spent over complex calculations, constant trips all over the Earth, and endless committee meetings, had not robbed Sir George Benson of his sense of humor or his affection for his favorite space crew.

"Come on, Uncle George," Chris said, with the easy familiarity born of long years of mutual affection, "tell us the news."

"All in good time," Sir George answered, enjoying the impatience of his young friends. "First of all, tell me what you know about your next objective — the planet Mercury. You begin, Tony."

The mechanic scratched his head in embarrassment since astronomy wasn't his strong point. However, he started off gamely enough.

"Mercury is the planet nearest the sun," he began. "It's much smaller than the Earth and must be very hot. It — er — goes around the Sun much faster than we do."

"All right," George Benson agreed, "that will do for a start. Now I want to hear from the others."

The three older astronauts looked at each other uncomfortably, each waiting for someone else to begin. Finally Chris took the plunge.

"As Tony says, Mercury is the innermost planet, its average distance from the Sun being only thirty-six million miles. It is a little larger than the Moon, being about 3,100 miles in diameter. The Mercurian year is only eighty-eight days — if we count it in Earth days."

"Yes, that's a point," Sir George agreed. "You see, Mercury keeps the same face permanently turned toward the Sun, so there is no day and night as we know it. Incidentally, Tony was quite right about the planet being hot. It is both the hottest and the coldest planet in the solar system."

"How's that?" asked Tony. "I should have thought that the planet farthest from the Sun – Pluto, is it? – would be the coldest."

"It would be, except that Pluto rotates and Mercury doesn't. So every part of Pluto does get a dose of sunlight, even though the distance is so very great. No, the coldest place in the solar system is definitely the dark side of Mercury which never gets any sun at all."

"About 700 degrees Fahrenheit on the hot side, isn't it?" asked Morrey, "and absolute zero on the dark side?"

"Roughly," agreed Sir George; "so you see, insulation will be a pretty ticklish problem."

"Are we to land on Mercury?" asked Serge.

"That hasn't been finally decided," the Director replied, "but look here, I'm telling you about Mercury instead of you telling me."

"Well, Mercury has gravity about a quarter as strong as ours," Morrey volunteered, "so the escape velocity – that is, the speed a spaceship would have to travel to overcome gravity – is only two and a half miles a second against our seven miles a second. Over to you, Serge."

"The planet has very little atmosphere, what there is being mainly carbon dioxide," the Russian said. "The surface is probably barren and rocky, much like that of the Moon."

"A number of maps have been made," Chris contributed, "but as Mercury is so difficult to observe, they aren't very accurate. By the way, wasn't there a theory at one time about another planet even closer to the Sun?"

"Yes," Benson agreed. "It was even given the name of

Vulcan, but it's now generally accepted as fictitious. Anyhow, that's one of the things you can settle for all time."

"If we don't land I expect we shall orbit the planet to make observations," ventured Serge.

"Certainly, but as I've already said, a final decision about a landing has not yet been made," Sir George told them.

"Have you solved the insulation difficulty?" asked Morrey.

"That might not be necessary," the Director replied. "You see, the orbit of the planet around the Sun is much more elliptic than ours, so its velocity varies considerably. This means that there is a small band around the planet where light and darkness alternate. If a landing is to be made it would have to be within this band in order to minimize the extremes of temperature."

"Have you any idea when we shall be on our way?" asked Tony.

"Not just yet. You'll have to run through the usual training program, of course. But, more important, you will have to get used to a fifth member of the crew," Benson told them. And there was a smile on his lips the group could not understand.

"Who is he? When shall we meet him?" demanded Morrey. They all knew how important it was that they should get to know their new companion well, and that he should come to know them. On a long voyage in space, the close confines of a small cabin always proved a severe test of the tempers of the crew. Unless each member was psychologically adapted to the others, intolerable tensions could develop under the conditions of a long journey. If the newcomer didn't fit in with them there would be nothing but trouble ahead.

"Patience, my friends," Sir George chided them. "You'll have plenty of time to get acquainted."

"What if we aren't compatible?" queried Chris.

"There isn't much fear of that," Benson answered. "We know more about each of you than you do yourselves. We've chosen someone you will like, although you four will have some adjusting to do. You'll meet your new crew member later today."

"What's the program now, sir?" Serge asked.

"I suggest you get something to eat and report back here at half past two," Sir George said, rising to his feet. "Now you may go!"

"What do you make of it?" demanded Tony eagerly. "A bit mysterious, wasn't he?"

The four astronauts were consuming thick steaks in a nearby restaurant. They had all been puzzled by Sir George Benson's seeming reluctance to tell them precisely who their new companion would be. After all, it was very important to them, and they couldn't understand why their chief had deferred his announcement.

"No doubt he will tell us this afternoon," Serge said thoughtfully. "But the whole thing *is* strange. And he gave us no information about telepathy, which is odd if they are really serious about it."

"Telepathy!" snorted Morrey. "That's a trick isn't it? Two people usually have a clever code for communicating with each other."

"That does happen, of course," agreed Chris, "but telepathy is also a scientific fact. For years, now, it's been investigated and put through various tests."

"What tests?" Tony asked.

"One of the simplest is to have the two people who can communicate with each other in different rooms. One of them is given a pack of playing cards and he looks at each in turn. The other writes down whether the card his partner is holding is a diamond, heart, spade, or a club. The number of correct guesses tells how good they are at transmitting their thoughts," Chris explained.

"I've heard of that," Morrey said. "Normally the chances of guessing correctly are one in four. Any significantly higher percentage would support the possibility that telepathy had taken place."

"Or that some very clever cheating had," interposed Serge.

"No, I don't think that's likely," Chris remarked. "Many tests have taken place under carefully controlled laboratory conditions, and I believe some people have proved their ability to communicate in this way."

"Yes, but guessing cards correctly is very different from being able to transmit a message, let alone a long and complicated one such as we send by radio," Serge pointed out.

"That's true," agreed Chris, "and Uncle George will be well aware of this. If the fellow we are to take with us can transmit the mass of data we have to send to Control he'll be something of a miracle."

"That would mean *two* miracle men," Tony laughed. "One with us and the other at Control to receive the messages. Far-fetched, isn't it?"

"We'll just have to wait and see," Chris said patiently. "Now who's for apple pie and ice cream?"

Over their coffee the four astronauts continued to discuss the new member of their crew. They couldn't help a feeling of resentment at this intrusion into their tightly knit little band. Their quartet had been together for a long time; they had faced and overcome many perils together, they had spent long periods in the close confines of a spaceship's cabin. What if a fifth member were to upset the bond that held them together? Or it might be that in order to preserve their own close relationship they would have to exclude the newcomer from their circle. This could very well generate friction on a long and trying journey.

It was only two o'clock when the quartet had finished lunch – a half hour too soon for their second interview with Sir George. Serge suggested a stroll in a nearby square where several children were feeding pigeons. To pass the time, the others agreed, and they spent the next twenty minutes idly watching the greedy birds eating crumbs the children were scattering.

"Come on, time to go," Chris announced at last. They turned and followed their leader silently in the direction of Sir George Benson's office.

"Commendably prompt." The Director smiled as he invited them into his office again. "Or is it curiosity that hurried you along?"

"We're very eager to meet our new recruit," Chris conceded. "We were unable to talk of anything else all during lunch. I hope you're not holding anything back from us, Uncle George. The new fellow isn't a weirdo, is he?"

They all wondered why the Director was so amused. Chris had never known Sir George to be so exasperating. If the new man were here, why didn't Uncle George introduce him at once? It would be hard to avoid prejudice against the fifth member of the crew if their Chief continued to be so difficult.

"All right, I'll put you out of your misery," Benson told them. Then he added more seriously, "Your companion will be a very important member of your crew and must receive all your help and consideration. However strange you may think this person, I want you to remember that we are going to carry out an experiment that may have far reaching results. I'm sure this important consideration will outweigh any private feelings you may have. Now follow me."

Sir George rose and strode out of his office, down a long corridor and then through a swinging door. The four astronauts followed in silence. Within a few seconds they would come face to face with someone George Benson was thrusting upon them. It would be hard indeed to accept the newcomer as a friend. Still, they would do their best to work with him if he would cooperate with them.

Through the swinging doors was a fairly large room and across it was another door.

"My friends, I want you to meet the new member of your crew." Sir George grinned wickedly as he stood aside for the quartet to enter. Leader Chris went first, and the others followed right behind. Inside the smaller room they stopped, rooted to the floor in amazement.

There was the new recruit, all right. But the new crew member was a girl!

2

"A girl!"

The gasp came from all four astronauts as they stared at their companion-to-be. A girl, and quite a nice one at that. She was on the tall side, with short, curly copper-colored hair, and a face covered with freckles. She was smiling nervously at the four astonished young men.

"This is Gail Patrick. Gail, this is Chris Godfrey, Morrey Kant, Serge Smyslov, and Tony Hale," Sir George announced.

Automatically Chris stepped forward and shook the girl's hand gingerly. He still couldn't trust himself to speak. A girl on a space journey with them! Of course, women had made single space flights before, but never for a moment had Chris expected to have one among his crew. Complications? Of course there would be complications. He wasn't a bit happy about the arrangement. One after the other, they greeted the girl while Sir George looked on benevolently.

Now that the first shock was over, the scientist went on briskly.

"Gail is an expert on telepathy," he said. "She is phenomenal. After more than a year of severe tests, she's been chosen to go along with you on the mission to Mercury. Then her powers will really be tried out. We propose to use telepathy as our chief means of communication during your expedition. The radio will be used only as a standby."

"Has – er – Gail had any experience?" asked Morrey.

"Not actual space travel," Benson answered promptly, "but she's going to be at Farnborough."

"I'm sorry I'm such a shock to you," the girl said uncomfortably, "but I hope you'll get used to me."

"Of course we will," Morrey declared gallantly. "Sir George hadn't told us we were to be joined by a girl."

"Thought it might have scared you off," laughed the scientist, "but now that you've met Gail I'm sure you'll get on all right with her. Where's your sister, Gail?"

"She'll be here any minute," the girl answered, and, sure enough, at that moment there was a knock at the door.

"Come in," boomed Sir George, and everyone turned to see the newcomer. It was then that the four astronauts got their second shock. Standing in the doorway was an exact replica of the girl to whom they had just been introduced. Since they were dressed alike, you could not tell one girl from the other.

"This is Gail's twin sister Gill," Benson said, performing the offices demanded by good manners. "Gill will remain at the Cape and receive and transmit messages, while Gail goes with you."

"Gosh, are you exactly alike?" asked Tony, the first to get over the shock.

"Almost, but not quite." Gail laughed. "Here, Gill, come and stand by me and let them see if they can tell how we differ."

Gill went over and stood by her twin sister, and under the amused eyes of UNEXA's Director the four embarrassed astronauts looked at the two girls closely.

"Blowed if I know which is which," Tony declared after a minute.

"*Is* there any difference?" asked Serge, more politely.

The twins were now highly amused.

"There is," one of them said. "Come on, see if you can spot it."

In the end all four had to confess themselves defeated and then begged the girls to reveal their secret.

"All right. We'll tell you," one of them said, taking pity on their new acquaintances. "Now look at these freckles."

To Chris's embarrassment the two girls pushed their faces close to his. He drew back a little, but this only made them laugh more.

"I'm Gill, and I've a big freckle here," one of the girls said, lifting up a lock of hair and pointing to her temple.

"And I'm Gail and have no freckle," the other one said, lifting up a similar lock of hair.

Sure enough, Gill had a particularly large brown patch on her temple. This was absent on her sister. As far as the astronauts could tell, this slight difference was the only distinguishing mark between the twins.

"Seems we'll have to scalp you to tell you apart," laughed Morrey, and the restraint among the six young people eased up a bit.

"Now that everything's clear, perhaps you girls will tell these young men your story," Sir George suggested. "However, come back to my office where we'll all be more comfortable."

In the Director's room the two girls and the four astronauts settled down in chairs.

"You begin, Gail," her twin said.

The girl began a little hesitantly.

"Well, as you can see, we're identical twins. There was a great deal of difficulty in distinguishing between us until these wretched freckles developed," Gail said.

"They are very nice freckles," Benson interrupted kindly.

"Sure," Morrey grinned, "but go on."

"Mother must have had an awful time with us," Gail continued, "but then I suppose that happens in most families where there are twins. From when we can first remember, we've always done everything together, dressed alike, had the same likes and dislikes, and we were always ill at the same time."

"It was Dad who first noticed we could talk to each other without the need of speech," Gill informed them. "He told us afterward that we'd be in a room together for a long while without speaking, but we'd laugh together and our faces and expressions would change just as if we were making audible conversation. He said he was a bit scared about it at first."

"I'll bet he was," Chris observed. "What happened when your family got used to the idea?"

"Mother used to scold us quite a lot," Gail answered. "She said it was impolite to hold these mental conversations that other people couldn't hear and join. But it was useful too."

"Yes. Do you remember when Mom and I went away on holiday?" Gill laughed. "You stayed with Dad at home. There was no need to write letters, because we could still speak to each other just as well. There was the day Daddy wanted a clean shirt and he thought Mom hadn't left him one. So he asked Gail to tell me to ask Mom about it. I did, and I told her Mom said there was a clean shirt in the laundry room which she hadn't had time to put away before we left."

"Daddy had his answer back more quickly than telephoning," laughed Gail.

It was plain that Chris and his friends were astounded. If it was true it was the most amazing thing they'd ever heard. And it *must* be true, for Sir George would have checked and tested them.

"Can you communicate over any distance?" asked the astonished Serge.

"Yes, as far as we can tell," both girls answered together.

"We took Gail to Cape Kennedy," Sir George Benson said, "and she was able to converse with Gill here in London quite easily."

"Whew! It's not only quicker than telephoning, it's cheaper, too," and Tony whistled.

"You'll be able to undercut Cable Company rates," Morrey said with a laugh.

"How long does it take you to get through?" Serge wanted to know.

"No time at all," Gail answered.

"That's what we want to find out," the Director said. "So far we've been unable to measure the time it takes for Gail to transmit her thoughts to Gill and vice versa. There seems to be a delay of about a second and a half, no matter how far apart they are. This may be due to the mechanism of transmission and reception."

"Any time taken when Gail was at the Cape?" asked Chris.

"Not as far as we can tell," Benson answered. "We had someone on the direct phone and he signaled us when Gail began to receive. Still the same one and a half seconds."

"But how are their thoughts transmitted?" asked Serge. "By anything akin to radio waves?"

"We're still trying to find out," Benson admitted, "and we're hoping that this journey of yours will help us. At least it will allow us to compare the velocity of telepathy and radio."

"Just think what it would mean if it were instantaneous!" breathed Morrey. "None of those deadly delays in getting an answer from a great distance."

"And no batteries, transistors, or aerials," the practical Tony pointed out.

"How did you meet the twins?" Chris asked the scientist.

"Quite by chance," Benson told them. "Mr. Patrick is chief draughtsman in an instrument factory. Somehow he heard that we were experimenting with telepathy as a possible means of communication across space. He wrote to me and told me about his daughters' abilities and described some of the things they'd done. To me it all seemed too good to be true, but the man I sent along to investigate was soon convinced. He phoned me in a highly excited state. And so the Misses Gill and Gail Patrick have been recruited by UNEXA."

"So the idea is that Gail should come with us to Mercury, and that she should transmit all our messages to Gill sitting safely with you at the Cape?" Chris asked.

"Basically that is correct," Benson agreed. "Of course, the bulk of your flight data will be sent to us in the usual way, but we propose confining all verbal communication to – er – telepathy."

"And suppose it doesn't work over such distances?" Morrey asked.

"You'll have old-fashioned radio to fall back on," Sir George answered patiently.

"You don't think we shall let you down, do you?" Gail asked.

Chris flushed a little. "Sorry," he apologized, "but you don't understand how much a space crew depends on reliable two-way chats with the fellows in Control. During a long, monotonous voyage the sound of a human voice pouring out of the loudspeaker can be a godsend."

"Sorry that you'll have to put up with my voice instead," Gail answered gently.

"Now that you've met I want you all to keep together as much as you can," Benson said, "and tomorrow we'll arrange a series of tests that will show you how reliable this means of communication is."

"If we're free now, Sir George, Gail and I would like to invite the crew home for tea," Gill told the Chief. The two girls had obviously been "speaking" together and had planned this invitation.

"Fine," the Director beamed. "What about it, fellows?"

There was nothing the four self-conscious astronauts could do. They had to accept the invitation with as much enthusiasm as they could muster.

"Where do you live? Is it far?" Tony asked.

"We live at Chislehurst, about twelve miles south of the river," Gail answered, "but I'm afraid our car is only a two-seater."

"We'll follow you in my car," Chris said quickly, for fear the girls would suggest mixing the passengers.

A few minutes later the two cars crossed over the Thames and headed down the Old Kent Road. It was just half past four when, with a squeal of brakes, the two vehicles stopped outside a neat bungalow on a dead-end street.

"Your mother won't be expecting us," Morrey said diffidently, "unless you've warned her by telepathy."

Both girls laughed at the idea of Mrs. Patrick being able to receive their thoughts.

"It's a good thing Mom isn't telepathic," Gill replied, leading the way up the garden path, "or we'd always have been in trouble."

"Hey!" exclaimed Morrey, stopping in his tracks, "you can't read other people's thoughts, can you? Mine, for example?"

The two girls laughed aloud at the expression on the American's face. It was some time before they could reassure him that they were able to receive each other's thoughts only. The astronauts, greatly relieved, followed the twins into the bungalow and were introduced to their mother.

Mrs. Patrick was an older edition of her daughters. The same hair, freckles and size, but without their peculiar gift.

"Daddy says we're mutants," explained Gail.

"What's that?" whispered Tony to Chris as they settled themselves in the lounge chairs.

"New types," Chris whispered back out of the corner of his mouth. "It happens every so often. That's how a species evolves."

The girls' mother made her four unexpected visitors very welcome, and, magically, produced an excellent tea on such short notice. Several times during the meal the astronauts saw evidence of the strange ability of their new friends. It was almost uncanny to see one pass something to the other without being asked aloud, and frequently the sisters exchanged looks and smiles as if they were having an interesting conversation about their guests. It was when Mrs. Patrick noticed Chris and his companions watching uncomfortably that she chided the twins. They immediately apologized but explained how difficult it was to refrain from using this very easy means of communication.

"Are you frightened that one of your daughters will be making a space flight, Mrs. Patrick?" asked Chris, anxious to steer the conversation into other channels.

"Not really," Mrs. Patrick replied. "It isn't as if Gail will be the first girl to venture into space. Besides, she'll be adequately trained for it, won't she?"

"You can depend on that, Ma'am," laughed Morrey. "The jolly old centrifuge, decompression chambers, arctic and tropic chambers, and so on. By the time she's been through them all Gail will be able to survive most conditions in space."

"Of course you four are all used to it," Mrs. Patrick pointed out, "but isn't it strenuous for a girl?"

"It shouldn't be if she's properly prepared for the strange conditions we meet," Serge answered. "Of course, anyone who hasn't been toned up would have a pretty bad time. The result might even be disastrous."

"When do I start my training?" asked Gail.

"Right away, I should imagine," Chris told her, "but I expect Sir George will be telling us tomorrow."

"We won't have to train as much as you," Tony said with the superiority of an experienced space traveler, but Chris quickly silenced him.

"Thank you for an excellent tea, Mrs. Patrick," the leader said. "We'd best be getting on now."

"Oh, aren't you going to let us give you a demonstration?" asked the disappointed Gill.

Chris and his companions hesitated. After enjoying the Patricks' hospitality, it would be difficult to run away.

"All right," he said on behalf of all of them. "What do you want us to do?"

3

"One of us usually goes into the greenhouse at the bottom of the garden," Gail said. "If Serge and Morrey care to go along with Gill, Chris and Tony can stay here with me. Then we can send messages backward and forward."

"You haven't got a secret telephone rigged up, have you?" grinned Morrey.

For a split second both girls flushed, but the friendly look on the American's face showed that there was no distrust behind his question.

"No," Gill said, smiling, "there will be no tricks. The greenhouse isn't wired for sound. Anyway, there will be some silent tests, too."

"Come on then," Morrey said, standing aside for Gill, "let the performance begin."

"Take this note pad and pencil with you," Gail suggested;

"you'll probably find it useful to write down the messages."

While Chris and Tony, scarcely knowing what to expect, waited with Gail in the lounge, her sister led the other two astronauts down the long garden and into the greenhouse.

"They're there now," Gail told Chris. "What would you like to say to them?"

Chris thought for a moment. These girls had satisfied Sir George Benson, and no doubt they were genuine. However it was essential that he and his companions have the same confidence in this method of transmission as they had in the instruments that play such an important part in navigation across space. As the lives of his crew would probably depend on the amazing gift of these two girls, his duty was to test it as well as he could.

"Ask Morrey and Serge what the small green box contained that we took with us on our journey to Jupiter," Chris said.

All four astronauts knew the answer, but it was impossible that the Patrick girls would.

"Right!" Gail said, "Here goes."

She shut her eyes for a few moments and appeared to concentrate. Then her features relaxed and she opened her eyes and smiled.

"Morrey and Serge say it contained a set of dentist's forceps in case one of you had a toothache," she told him.

Chris and Tony were astonished, for what Gail had said was true. To make absolutely sure, however, that this was no fluke, he asked a number of questions that only his friends could answer. Each time the correct replies came back swiftly and with certainty. Then Chris thought of another test.

"Here's an algebra problem," he said, writing down a number of symbols. "Ask Serge to give you the answer."

He knew it was unlikely that either Gail or Gill would understand the difficult problem he had set, let alone be able to solve it. Again Gail shut her eyes and transmitted, though she had to repeat the process several times before she'd completed it. Once it seemed that she was checking something, for unconsciously she nodded her head as if agreeing her sister had received correctly. She opened her eyes and smiled at her new friends.

"I'd better have a pencil and paper ready," she suggested.

Tony pushed these toward her, while Chris kept up a running conversation so there could be no question of Gail's working out the problem mentally even if she had the ability to do so.

"Excuse me a moment," Gail said, breaking off abruptly. Again she closed her eyes for a few seconds, opened them, scribbled rapidly, and repeated the process.

Chris looked at the completed answer. It was correct.

"Just one more test," the astronaut said. "Will you transmit this sign to the others."

He drew this ☿ shape on the pad.

"What's that?" Gail asked.

"Never mind," Chris smiled. "Just get Morrey to draw it and then bring his paper here. That will end our test."

The girl looked intently at the figure Chris had drawn in an attempt to memorize it. Again her eyes were closed as she transmitted its shape.

"Done," she declared, and looked with amusement at Tony and Chris. Soon they heard the others returning from the greenhouse. Morrey had a paper in his hand which he passed to his leader. On it he had drawn ☿ exactly.

"Satisfied?" Gail asked innocently.

Each of the four declared himself convinced. They could certainly rely on the two girls under terrestrial conditions, but would they stand up to the strange conditions out in space?

"Do tell us what that sign is," Gill said.

"It's the ancient symbol for the planet Mercury," Chris said. "Now we really must be off, for we start training tomorrow."

At ten o'clock the next morning the four astronauts reported to the C.O. of the British Space Training Center at Farnborough. Here the finest facilities in Europe for preparing space travelers for their ordeal had been built. Here also were lecture theaters and briefing rooms where astronauts could receive the latest information about conditions in space and on all the main planets.

Gail was due to join them, but at ten minutes past the hour the girl had not arrived.

"Trust a woman to be late," growled Tony, but before any of the others could comment there was a squeal of brakes from a small green car. Gail extricated herself from the low seat and held up her soiled hands in explanation.

"Sorry; puncture," she said simply.

"I suppose that lets you off," Chris said, smiling, "and I was just about to yell. Meticulous punctuality is vital in our job. Now the C.O.'s waiting, so you'd better come and be introduced."

Group Captain Lambert, the Commanding Officer of the Training Center, was an old friend of Chris's. Even before he'd been promoted to his present post this Air Force doctor had been associated with the training and conditioning of astronauts. It was because they were seasoned travelers that Chris and his crew had met Lambert so often. Now that he was in charge of the Center the Group Captain would be responsible for the physical and mental fitness of the four young men and the girl.

The Group Captain shook hands politely with Gail. He didn't really like training girls for space work, though he'd had a number already and some of them had done well.

"I must warn you that you're in for a rough time, Miss Patrick," he said, "because you will have to undergo the same training as the men."

Gail nodded.

"Yes, Sir George Benson explained that to me," she said. "I'm not worried. I'm sure that after a bit of practice I'll be able to do as well as the men."

"You'll have to," Lambert said firmly, "otherwise you're out."

"What's the program?" Serge asked.

"First take this young lady on a tour of the Center and explain all our instruments of torture to her," the Group Captain said. "Then this afternoon you can take her for a ride."

"That will be nice," Gail said brightly; "where shall we go?"

"We shan't go anywhere, my lass," Morrey answered, "except around and around. 'Going for a ride' means having a spell on the centrifuge. Come on, we'll show you."

Accompanied by her four escorts, Gail was taken around the Center and shown inside the many buildings. One block contained vacuum chambers in which astronauts could spend a spell in almost the same emptiness as in space. Then there were high and low temperature chambers, each capable of giving the future space traveler a foretaste of the heat or cold he would encounter in his celestial wanderings. There was an ingenious device which, when a subject was strapped to it, rendered him weightless but enabled him to move freely in any direction. This was to simulate as nearly as possible the zero gravity an astronaut has to encounter. But the apparatus that most intrigued Gail was housed in a giant circular building. This was the infamous centrifuge.

"Come on inside," Chris said to the girl, "and we'll get someone to explain how it works."

A white-coated technician was asked to describe the giant machine. He pointed proudly to the vast electric motor in the center. "The most powerful in Britain," he said proudly.

The motor turned a long arm from which hung a small cabin which he called the gondola. It was inside here that the astronauts lay to undergo their training for the fearsome acceleration set up by the giant rockets. When the victims were safely installed the motor would be started and the arm would be whirled around at an ever increasing speed. For runs under low acceleration the gondola would be positioned close to the center, but it would be moved gradually outward toward the end of the revolving arm, subjecting the trainees to even more fearsome acceleration.

"We can give you up to 23 g," the technician said proudly.

Serge could see that the girl didn't understand, so he hastened to enlighten her.

"We call a force equal to the Earth's gravity one g," he explained. "In figures it means a force that would accelerate you by twenty miles an hour each second. After five seconds under one g, you'd be traveling at a hundred miles an hour. Twenty-three g is, of course, twenty-three times as powerful. It means that you'd be doing 460 miles an hour after one second, 924 after two seconds, and so on."

"But we don't use acceleration as fierce as that," Chris hurriedly explained. "About seven g is the usual, but we like to see how much we can stand."

"Think you can manage seven g?" Tony asked Gail teasingly.

"I'll stand as much as you – and more," the girl replied firmly.

"We'll see," grinned Tony.

"Cut that out, Tony," Chris said sharply.

"The whole purpose, Gail," he went on, "of these spells at Farnborough is to accustom your body to the conditions we shall have to meet during our journey. Unless astronauts had this intensive training they would find space flight very uncomfortable and they'd be unable to carry out their duties. The four of us have made many flights and have had long spells at Farnborough and at other centers. We are reasonably prepared and toned up for space travel, but for you it is something new. You mustn't try to do too much too soon just because Tony is teasing you."

Tony protested his innocence, but a warning glance from Chris told him not to take his joking too far.

After a light lunch – "No more pies and cream from now on," sighed Morrey – the five young people again presented themselves at the huge circular building where the centrifuge squatted like a great monster lurking in its den. White-coated staff met them and then Group Captain Lambert himself arrived.

"As there are five of you, you'll have to use the large gondola," he said, "unless you'd prefer to split up into three parties and use the small one."

"Can we all keep together?" Gail asked a little uncertainly.

"We'll use the large car," Chris decided. Whenever possible he wanted them to do their training together. It would help to weld them into a team and it would also help him to assess his new recruit's capabilities.

"Righto!" the C.O. agreed. "We're going to give you up to three g without suits, and then repeat with suits. This will show the young lady that if spacewear isn't exactly fashionable, at least it does its job."

"All aboard!" Tony called out gaily, and the five subjects clambered up some steps and walked along a circular gallery until they reached the large gondola parked conveniently at the end of the great arm. With the assistance of two more members of the staff the five, led by Gail, entered the car ready for the first run.

The girl looked about her with curiosity and perhaps a little fear, though she would have died rather than show it to the others. Five couches alongside each other filled almost the entire car. Across each were safety straps much like the belts in a plane. Everywhere there was a confusion of wires, each taking some item of information about the subjects to the doctors looking down from a long glass window.

"There will be no instruments for this run," one of the white-coated attendants told them. This was a relief, for it was a long and tedious job for all the many instruments to be fastened to their bodies so that the medical staff could monitor the effect of excessive stress on the way they functioned. As each lay on a couch the safety belts were fastened.

"Oh, Sir George Benson hopes we have a pleasant run," Gail said suddenly as they lay there waiting for the vast machine to move.

"Sir George – what? What are you talking about, Gail?" Chris asked in astonishment.

"Just that Sir George sends his regards and hopes we have a pleasant run," the girl replied simply.

"How do you know that?" Serge asked.

"Didn't I tell you that Gill was spending the day with Sir George? She's just given me his message."

"And you've been in touch with your sister all along?" asked Morrey, scratching his head.

"Of course," Gail answered. "We are never out of contact. I've been telling Gill all that has been happening and she's sent Sir George's message back to me."

"I still can't quite believe it," Morrey gasped. "It all seems spooky to me."

"Actually Sir George is conducting an experiment," Gail explained. "I told you how Gill and I always had the same illnesses and suffered from the same discomforts. Well, Sir George wants to find out if Gill feels anything when I'm under high acceleration of this centrifuge. That's why she's with him at this moment."

"Thank Sir George for his message," Chris said, "and ask him if we can all go to the theater tonight."

Even as their leader spoke the five felt the gondola begin to move. But it was not yet moving around. Instead it was traveling along the arm nearest to the center. This was because it was to be a low g run. The nearer to the outside end of the arm, the greater was the acceleration.

"Sir George says all six of us can go if we wish," Gail piped in. "He wants to know if there's a particular play you'd like to see."

4

Before the five young people in the gondola of the centrifuge could begin to discuss the serious problem of what play to see that evening, the arm of the huge machine began to move. Slowly at first, then with ever increasing speed, it went around the building, driven by the monster motor at the center.

Inside the cabin Chris and the others fell silent. Without space suits the run was not going to be very comfortable. How would Gail stand up to this first ordeal? The same question was in the girl's mind as she felt herself pinned down to the couch with her head, arms, stomach and legs seemingly turned into lead. At an acceleration of three g, everything would feel three times heavier. It would take three times as much effort to raise an arm or leg against this artificial gravity.

Gail felt very queer for a few moments. This was due to the unaccustomed strain she was feeling as well as to her efforts to suppress the alarm caused by the novel sensation. The other three were, of course, accustomed to far greater thrusts, so they were able to watch the pale face of the girl as she fought for composure.

At last the thrust died away and the arm of the centrifuge began to slow down. Gail breathed a sigh of relief. The uncomfortable period was over and she didn't think she had revealed to the others just how scared she had been. As the huge machine came to a halt they all squirmed out of the couches and waited for the door to be opened. The first thing to be done as they stepped outside was to have a medical examination. Particular attention was paid to Gail, and she was pronounced quite fit.

Back in London Sir George Benson watched Gail's sister curiously. She'd been describing to him just what was happening at Farnborough, right up to the time the five astronauts entered the gondola. Then, for the first time Gill's reports became fragmentary, and it was quite plain that she had been affected by her sister's alarm. At Benson's suggestion she lay on a sofa he'd had brought into his office during the lunch break. As the centrifuge began to turn miles away, poor Gill reacted as if she herself were pinned down by the same crushing force as her twin. No message passed between the girls during the period under thrust, but Benson knew immediately when the centrifuge began to decelerate, for Gill relaxed and sat up. So the tension in the mind of Gail caused by her first experience with the centrifuge was reproduced, it seemed, in the mind of her sister, Gill.

An interesting fact, mused Sir George, and wondered whether the girls would be able to communicate when Gail had become accustomed to the high acceleration. If they could, it would certainly be an advantage. It might even be possible to get reports from a rocket when the thrust was too great to allow the crew to move or to use their radio.

"What am I to do now?"

The voice of Gill recalled the Director to his surroundings.

"Nothing more at the moment," he said, smiling apologetically, "so I suggest you run along and book those seats. Take this. The expenses are on me. You'll let your sister know what play you choose?"

"Of course," Gill answered brightly. "She'll know as soon as I do."

"Uncanny!" Benson exclaimed as the girl left. "I wonder if this telepathy will help us on our journeys to the stars."

It had been Group Captain Lambert's intention to let the little party have a second run on the centrifuge wearing space suits to show their effectiveness. Unfortunately, Gail's was too large and the Group Captain wouldn't let her wear it.

"I'm afraid you'll have to postpone your next trip until tomorrow," he told the astronauts. "We must make a few alterations on Miss Patrick's outfit. That also means you won't visit any of our torture chambers — at least not to try them out."

"Excuse me, sir," Gail apologized, "Gill is just asking if any of the boys have seen the current show at the Paladium. She's at the box office now."

Her companions were still finding it difficult to accept the amazing gift of the two sisters, and Lambert was equally nonplused.

"Er — no. I don't think any of us have seen it," Chris said.

"Fine. She'll book the seats right away," Gail answered, completely oblivious of the astonishment of the others. "Oh, they haven't any seats in the orchestra. Will the balcony do?"

"I still can't get used to them," Serge sighed, as the friends waited for the twins outside the theater that evening.

"It's not easy," agreed Morrey. "You know, those two could make a fortune in a show like this. Wonder why they've never gone in for it."

Gill and Gail arrived before anyone could think of an answer. The four astronauts looked at the girls in some confusion, for again they were dressed exactly alike and — well, you can't lift a girls lock of hair up to see which twin she is, can you? At least not outside the London Paladium.

"I'm Gail," one of the pair said, "and I'm wearing a brooch with my name on it."

"So am I," her sister said, smiling, and Chris and his crew saw that the girls were wearing small name brooches.

"That makes it a lot easier," laughed Morrey. "Now we'll know which is which."

The girls seemed to be sharing a secret joke, but there was no time to ask what was amusing them, for the curtain was about to go up and they hurried along to their seats.

It was a good show, and the six young people enjoyed every act. During the intermission, Serge went off to get ices for all of them, leaving the others to chat together. Just before the intermission was over, the girls left their seats but soon returned. Chris and Tony had Gail between them, while Gill was flanked by Serge and Morrey. They were getting to know each other better, and the four young men decided that the twins' sense of fun was as keen as their own.

When the show was over the six, talking animatedly, adjourned to a nearby restaurant for coffee and sandwiches. It was nearly midnight when Chris called a taxi to take the girls home, for they had insisted that they required no escorts. As they were wishing each other good night the girls' amusement bubbled over.

"Sorry we played a trick on you," one of them said. "We changed brooches and seats during intermission."

"Gosh!" exclaimed Tony, "so it was Gill who was sitting between Chris and me! And we thought it was Gail!"

"It *was* me until the first intermission," Gail confessed. "Hope you're not angry."

"No, but I hope the right one turns up at Farnborough tomorrow," Chris responded with a slightly worried sigh.

"We won't do this to you again," Gill promised, "but we had to do it just once."

"I'll be there all right in the morning," Gail assured Chris. "I'll be sweating it out in the torture chambers or on the centrifuge, while my beloved sister takes her ease at home."

"Well, you won the toss of the coin," Gill pointed out, and then the taxi pulled away.

The next few weeks followed the pattern that was all too familiar to Chris and his crew, but which was a new and trying experience for Gail Patrick. Nevertheless the girl went through her training with grim determination, winning the admiration of the four young men. By now a strong friendship had grown up between the four astronauts and the Patrick twins. "Even though they're girls," Tony conceded.

Naturally, it was Gail whom Chris and the others saw the most. Benson had insisted that the training should be done together and, as anticipated, this had welded them into a team as well as showing Chris the girl's capabilities.

Poor Gill had a less interesting time, often complaining that she was nothing but an easy means of communication between the five in training and Sir George. For it was true that the Director frequently used the sisters when he wanted to consult Chris or even Group Captain Lambert.

At last the day came when the Farnborough training was over, and the five said good-bye to the Group Captain and his assistants. There followed a short, sharp spell at Huntsville, Alabama, which was America's equivalent to Farnborough. Then the day came, at last, when they made the journey to Cape Kennedy.

Known at one time as Cape Canaveral, the great rocket base had been renamed after the brilliant young American President who had been assassinated. It was from here that most of the space ships were launched, for Cape Kennedy was the center of a fantastic system of worldwide communication, linking together tracking stations and radio telescopes all over the Earth. The vast area of the Cape was the scene of ceaseless activity as tens of thousands of scientists and technicians prepared, supervised, and monitored the frequent journeys into space.

Chris, Morrey, Serge, and Tony had been here many times before; Gail only once, some months previously, when she'd been tested for telepathy. Gill as a newcomer was, of course, staggered by the vast installations. Under the guidance of Sir George Benson the little party was taken to the austere building where they would stay until their ship was launched.

The following day the weather was perfect. A warm sun shone from Florida's brilliant blue sky. Scarcely a cloud was to be seen as the six young people, together with Sir George Benson sped in two jeeps across the desert.

A long, straight concrete road carried them over the countryside. On each side were the numerous launching pads, each with its quota of long, low buildings. Even as the little convoy raced along, a shattering sound came from a distant pad. A few seconds later the two girls witnessed one of the most exhilarating sights in the world – a long, silver rocket climbing ever faster into the blueness above. The party halted and climbed out of their vehicles to watch the space ship on its journey.

Higher and faster the rocket flew, its tail of fire still glowing brightly even in the sunlight. Indeed, as the ship grew ever smaller, it was the tail that marked its progress up into the vast blue sky. At last, after what seemed an age, that too disappeared. There was a long sigh from more than one of the watchers as their thoughts returned to Earth.

"The weekly ferry off to Lunaville," Benson explained simply, and the girls knew they had witnessed the departure of men and materials to that fantastic base on the Moon. Almost with reluctance they climbed back into the jeeps.

"Oh, it was beautiful!" Gill exclaimed, as the vehicles jerked away.

Ten minutes later Sir George called a halt once more.

"There it is," he said, raising his arm and pointing.

In the distance, perhaps more than a mile away, the young people could see a tall steel structure like a giant lattice work. This was the service gantry that is essential to every launching. Nestling behind the gantry, and almost obscured by it, was the tall slim shape of a rocket – *their* rocket.

"Let me introduce you to *Mercury I*," Sir George said.

Chris and the other three knew the custom of christening each ship after its objective and the number of shots that had been made there. This was the first rocket that was being sent specifically to explore the innermost planet. Soon the jeeps continued for the young scientists were impatient to reach their objective. They were so eager to see and touch the giant that would carry them to another world.

"Here we are," the Director of UNEXA announced. "Come and meet Billy Gillanders before we go out to the pad."

The jeeps had stopped by the building that formed the main control center for the Mercury project. Waiting for them was a tall, bronzed man who greeted Chris and his friends enthusiastically. Mr. Gillanders, an Australian, was one of Sir George's deputies, and the four astronauts were old friends of his. He was introduced to the two girls and looked at them curiously, for he was not very optimistic about the results of the telepathy experiment. In return the Patrick twins stared at the tall, handsome man as they shook hands.

"Come inside," he boomed, "and I'll show you where we do the work."

It was obvious that this building had been constructed for use and not for ornamental purposes. Outside it was a squat, uninteresting block with a number of small windows like portholes in the side of a ship. On the flat roof was an array of aerials of every conceivable shape. Projecting at one point was the tube of a telescope used to follow visually the early stages of a space ship's flight. Mr. Gillanders stepped aside and waved the little party through the entrance door.

If the outside of the control building was unimpressive, the inside was another matter entirely. A long room led off one side of the entrance hall, and in this was an array of instruments such as neither of the two girls had ever dreamed of. Along almost the whole length of one side, beneath the portholes, was a vast panel which was a mass of switches and signal lights. From here the score or so of scientists on duty were able to control every phase of the space ship's preparation and launching. They would check the effectiveness of the numerous vital components in the rocket by telemetered data from the ship itself. Only when all the signal lights were on green would the red firing switch, located right in the middle of the center section, be pressed.

Along the opposite wall were a dozen smaller instrument panels. These housed the apparatus that registered the data radioed from the ship after launching, its velocity, acceleration, temperature, pressure inside, fuel consumption, and even the amount of oxygen in the space ship's cabin. Long rolls of paper were unwinding from some of these instruments, and on these the staff would have a continuous record of the ship's performance.

Mr. Gillanders, occasionally assisted by Sir George, explained the setup to the girls. Chris and his friends listened tolerantly, for they were familiar with this dizzying display of modern wizardry. Then the little party crossed the hall, and entered the other half of the building.

In one room there were countless telephones installed, each leading to a tracking station or radio telescope. During a flight, this communications room would be filled with quiet-spoken men and women who would be speaking to observers all over the world, getting the vital information that would indicate whether the space ship was on its correct course.

Another room into which the party was ushered housed the giant computer, a vast apparatus that performed miraculous feats in calculating the ship's trajectory and working out procedure for any corrections required. Beyond the computer room were offices as well as comfortably furnished rooms in which to relax.

"Gill, you'll be spending most of your time here," Sir George Benson explained, indicating a room where there had been some attempt at interior decoration. The girl looked around her quarters with interest, but her sister was obviously impatient.

"All right," said Sir George, "I know you are all dying to see your ship. Come along and I'll show you *Mercury I.*"

5

"There she is!"

The six young people, together with the Director of UNEXA and his deputy, had walked around the control building and were looking across the countryside. Half a mile away, in the direction Sir George was indicating, the familiar lattice of a steel gantry towered some three hundred feet from the ground. Nestling against it was a gleaming space ship – their ship!

"Jump into the jeeps," Sir George said, "we'll go and look her over."

Eagerly the little party piled into the waiting vehicles and soon they were tearing along in the direction of the large steel structure. As they came nearer, the girls became aware of the huge size of the gantry and the towering ship it would serve.

"Yes, she's as big as anything we've launched before," Mr. Gillanders said proudly as they scrambled out of their jeeps about fifty yards from the launching pad.

Even at this distance the twins could see that many men were working at various levels of the gantry. An elevator carrying men and materials ascended and descended. There were a number of openings in the silver casing of *Mercury I,* and men were clambering in and out.

"We're well up to schedule," Gillanders reported. "No big snags so far."

"Good," Benson answered with satisfaction. "That means, Chris, that you'll be able to blast off in ten days. Now, let's get started.

Led by Sir George they walked toward the gantry and the men at work. Mr. Gallanders spoke to one of them and the elevator came shooting down to carry them up to the first platform. Only four people could squeeze into the lift, so it took a couple of trips to bring them all together on the first level.

Chris, Morrey, Tony, and Serge peered into the open section of the casing with interest. They could see the control valves of the huge fuel tanks for the first stage of the rocket.

"Liquid hydrogen," Morrey observed, looking around at the mass of pipes and pumps.

"Yes," Benson agreed. "You'll want all the lift you can get from the first stage. Though its tricky to handle, liquid hydrogen gives thirty per cent more power than other fuels."

"What about the other stages?" Serge asked.

"All liquid oxygen and alcohol," Mr. Gillanders informed them, "except, of course for the ion motor."

"Perhaps the girls would like to go straight up to the cabin," Benson suggested, seeing that neither Gail nor Gill was interested in technical details.

"Good idea," Tony declared enthusiastically, for though he'd be intimately concerned with the mechanical side of the space ship, he was eager to see their living quarters, particularly now that there was a girl in the crew.

Mr. Gillanders led the way, and soon the lift had deposited the party on the penultimate stage of the gantry. Here six of the white overalled technicians were engaged. At the request of Mr. Gillanders, they climbed out through the hatch so that the party could peer into the cabin.

Politely the astronauts stood aside, permitting the twins to get the first look. Then, one by one, they squeezed through the hatch and just managed to stand up inside.

"Not much room, is there?" Gill remarked, as she looked around with bright, wide eyes.

"We are crowding the cabin," Sir George agreed, "but it has been specially designed for a crew of five."

"Good thing Gail doesn't suffer from claustrophobia," Chris said, smiling. "If she did, she'd have a pretty bad time on the voyage."

The five contour couches, on which the crew would recline during launching, and on which they would sleep and rest, were already in position. Each had been molded to fit the body of one particular person, and Chris and his friends soon picked out theirs.

"This must be yours, Gail," Morrey said, and Mr. Gillanders confirmed that it was.

The instrument panels that occupied half of the cabin wall space were familiar to the astronauts, but to Gill and Gail they were objects of mystery.

"Don't worry about them," Benson laughed, "they're the responsibility of the male crew."

The Patrick girls felt more at home peering into the lockers which would eventually store the food and drink, for Gail had been told that she must be responsible for these.

"We've – er – rigged up a special compartment for Gail," Mr. Gillanders said a little awkwardly, nodding toward one side of the cabin.

"Just in case you get tired of the crew," Sir George smiled, "at least you can get a little privacy whenever you want it."

The Deputy Director went on to explain, mainly for the girl's benefit, the layout of the cabin which would be the crew's home for many long days. Much of what Mr. Gillanders said was beyond the comprehension of either Gail or Gill, but it was all very fascinating.

"And this is the radio – which you won't use," Sir George interposed with a twinkle. "At least, we hope you won't!"

"Can I try my couch?" asked Gail.

"Certainly," Benson smiled, "but don't go to sleep on it. When we get back to Control I'm going to tell you the date of your departure."

After another half hour spent exploring the mysteries of the gleaming monster, the little party assembled at the foot of the gantry and were driven back to Control.

"Right," said Benson, as they all settled down in his small office. "Now that you've seen *Mercury I,* I'll give you some details of the flight plan."

"Do you want me to go?" interruped Gill.

"You may as well stay," the Director smiled, "for it seems that anything your sister knows, you know, too."

Sir George waited while the six young people gave him their close attention. This preliminary briefing, which would be followed by many more, would give them their first idea of the hazards they were soon to face. From now on Chris, Morrey, Serge and Tony would have a busy time absorbing all the information they could about their objective and discussing what they would attempt to do when they reached it. The two girls, on the other hand, would have little to do until the launching, for neither would be directly concerned with the navigation of the ship and its attendant problems.

"We plan to launch you at 1000 hours on July twenty-first, that is in ten days' time," Sir George Benson began. "The reason we have chosen this date is because it will allow you to reach the planet at its nearest point to the Earth. However, you'll still have to travel over fifty million miles."

"Fifty million miles!" breathed Gail.

"That's nothing," Tony said quickly. "When we made our journey to Jupiter we covered seven hundred million miles. Fifty million is practically on our own doorstep!"

"Hardly that," Benson said patiently, "but I grant you that distance isn't the greatest problem. Unfortunately we have one much more serious – radiation. Mercury, in the position which you will meet it, receives about five times as much radiation from the Sun as Earth does. That means that you will be subjected to an intense bombardment of the rays and particles from which we are protected by Earth's atmosphere. One of the important reasons for your mission is to test various types of shielding for use against this harmful radiation."

"We are in the middle of a period of low sunspot activity," Mr. Gillanders observed. "You shouldn't have much trouble unless one flares up unexpectedly.

"So we're in for a hot time," Morrey said.

"Yes, in more ways than one," Benson agreed. "Of course we shall be monitoring your experiences continuously, and if we think you are in danger we shall recall you. That's where these two young ladies will play such an important part. If their telepathy proves to be instantaneous it can save up to four minutes in getting vital orders to you."

"It took nearly an hour to get a radio message when we went to Jupiter," Tony whispered to Gill who was sitting next to him.

"Now as to your flight program," the Director went on. "After blast-off you will make the first corrections to your trajectory before switching to the ion motor. That should occupy your first hour of flight. You will then continue under the ion drive for a further fifty-seven hours, which should bring you approximately to the halfway point. After turning the ship you will decelerate under the ion drive, starting up your chemical motor when about twenty thousand miles from the planet."

"So we'll be about five days on the journey?" asked Serge.

"Near enough," agreed Sir George. "Not too bad, is it? After approaching Mercury we shall want you to get into orbit. How many orbits you'll make, or whether a landing will be attempted hasn't yet been decided. It will probably depend on conditions you meet out there."

"You know, this mission is going to be dead easy compared with some we've had," declared Tony.

"Is it? I hope you're right," Benson answered noncommittally. "But to proceed. If it is decided that you are to make a landing, it will be a very brief one and will be along the terminator – that is on the line between light and darkness. Conditions there are not likely to be as extreme as on the light or dark sides of the planet. If, however, there is not to be a landing, you will take observations during several orbits before breaking off and returning to Earth."

"If we land, do we leave the ship?" Chris wanted to know.

"That depends on conditions you find – temperature, radiation, terrain, and so on. Your suits will be tested up to the temperature limits we think you'll find on Mercury."

"What do we do from now to D-day?" Gail asked.

"Well, there's very little for you girls to do, except to keep fit and stay out of trouble," Benson answered with a smile. "The others, I'm afraid, will have to do all the work, and there's a pretty full program for them. However, I hope they, too, will get some relaxation now and then."

"Shall we visit the ship again?" Gill asked.

"Of course. You'll even have a practice take-off. And it will duplicate the actual launching except that the motor will not be fired. You will be able to try out your telepathy under conditions as near as possible to the actual flight," the Director told her. "Now I think that will do for the moment."

As Sir George had predicted, the days that followed were extremely busy ones for Chris and his three companions. There was a great deal of briefing and discussion. They had to familiarize themselves with the space ship's instruments. Tony spent long hours clambering to every part of the ship, so that he knew just where every piece of mechanism was. Finally there was the loading of the rocket with everything they would be likely to need.

July 21 was drawing nearer and excitement was mounting. The last few days and hours of a countdown are always very tense, for it is during the final checks that take place in this period that faults may be discovered that could postpone or even cancel a launching. The closer it came to blast-off time, the greater the strain on all those preparing the giant ship for its voyage.

Gill and Gail, as Sir George had said, were not required to do very much. Gail had regular exercises in order to maintain the fine condition which the toughening-up process had given her at Farnborough. Then, one evening, Sir George sent for the two girls. When they met Chris and his companions a short while later, Gill and Gail were wild with excitement.

"You'll never guess what's happening," Gail burst out. "Oh, its marvelous!"

"Steady," smiled Morrey. "If we'll never guess it, why not tell us about it?"

"She's going to Lunar City!" exploded Gill, unable to contain herself any longer.

The astronauts really were astounded.

"W-what's happened?" gasped Tony.

"As we've nothing much to do here, Sir George thought it might be a good idea to send me on the ferry that leaves in the morning. He says it would be good training and we could check up on our telepathy," explained the excited Gail.

"Isn't she lucky?" said the slightly less exhilarated Gill. "Anyhow, Sir George has told me that if all goes well we can change roles on the next mission."

"But when will you be back?" asked the dazed Chris, slightly annoyed that Sir George hadn't told him.

"In three days," Gail said. "Oh, don't be stuffy, Chris. Don't you agree it will be good training?"

"Well, yes," conceded the leader, "but I wish we were going with you."

"You've been there dozens of times," Gill pointed out.

"Yes, but not with one of you," Morrey observed, and then for some reason he blushed.

"Then we'll see you off," Serge said quickly to cover his friend's confusion.

At four the next morning, the Lunar ferry rose smoothly from its pad on its routine journey to the vast base on Earth's satellite. It was no longer an exciting event as it had been a few years before. Only the presence aboard of Gail Patrick made this trip any different from the routine twice-weekly journeys that were made during the year.

"It was a sudden idea," Sir George Benson told Chris back in the block house. "I knew the girls had little to do while you were making the final preparations. As there's almost no risk, I wanted to test communications across space. Better to do it now than to find out telepathy doesn't work after you're on your way to Mercury."

Chris had to agree that what the chief scientist said was sound. He hoped fervently that Gail would be all right and that the strange powers of the twins would operate across the black vacuum of space. Now that he'd become accustomed to the idea of a girl aboard, the astronaut hated to think of a last-minute change.

"Standing for testing. . . ."

The voice on the Control loudspeaker was coming by radio from Lunar City. But it wasn't the radio that was under test. In a few seconds a message should come from Gail to her sister waiting calmly at Sir George Benson's side.

"Aren't you nervous?" whispered Morrey to Gill. The girl smiled but made no reply.

Suddenly her face became serious as she concentrated on her task. She cleared her throat and repeated a long and fairly complicated message which was recorded. The little knot of men surrounding her wondered if this was really coming across a quarter of a million miles, and if so how it would compare with the radio version which would come in five minutes later.

"Perfect!" Sir George announced as he compared the two messages. "Not a single mistake. Congratulations to both of you. Tell Gail, will you?"

"I already have," Gill Patrick answered.

"Why were you so confident?" asked Tony.

"Because we were never out of touch for a second," Gill told him.

Right on schedule the other twin returned to Earth and was met by her sister at the Cape Kennedy space port.

"Aren't you going to tell Gill all about Lunar City?" asked Morrey as they drove toward the Control buildings. "No. Don't say it," the American added. "You have already."

"What there was to tell," Gail admitted. "I only saw the inside of the ferry, the landing bay, and the Commander's office."

During the next few days Gail and Gill spent most of the time on the beaches of Florida, for Sir George had given them the use of a jeep. Soon it became a familiar sight around Cape Kennedy to see the jeep driven by one of the twins, speeding over the flat ground toward the sea. Often the vehicle was followed by the envious glances of the four young scientists whose duties prevented them from joining the girls.

"You're getting horribly sunburned," Morrey once said in pretended disgust. "I hope you suffer from all this exposure."

"Now, now!" laughed Gail. "Stop this envy. Can we help it if we have nothing to do except swim in the glorious, blue sea and sun ourselves on the golden sand?"

Morrey's only reply was a growl.

Once, during this trying period, Sir George released all the crew and allowed the six young people a half day on the beach together. Chris was a little self-conscious about his pale skin, and tried to keep well away from the golden tan of the Patrick girls.

"You'll have to pin your name badges on your bathing gear," Chris said to cover his embarrassment.

"Not much room, is there?" grinned Morrey.

Always, since that first mistake, the girls had worn the brooches distinguishing one from the other. Without them it was still impossible to tell them apart. Obediently Gail and Gill managed to find sufficient material on which to pin their names.

"Just two more days," Serge observed as the party reluctantly left the beach. "Don't suppose we'll get another break like this."

They didn't. Preparations were mounting to a crescendo, and the hours seemed to fly past as Chris and his men had their final instructions and made the last tests on the instruments they would use. Just twenty-four hours before blast-off a mock launching was held. Together with Gail the four crewmen donned their suits and were taken up on the gantry lift to the hatch of their cabin. Then they settled down on their couches and the hatch was sealed. But this was different from any countdown, mock or real, that Chris and his friends had ever known before. Instead of a stream of messages over the radio, it was through Gail that their instructions came.

As the girl lay on her couch she received communications from Gill, who was with Sir George in the Control building. Chris replied by the same means, and though it was not quite the same as direct speech with the Director, it seemed accurate enough. Gail even repeated the count of the last few seconds as transmitted to her by Gill. At zero, there wasn't, of course, any lift off, but the crew remained in the cabin for a full hour afterward. Chris went through the motion of correcting the ship's trajectory from instructions relayed by the twins.

"That seemed to go smoothly enough," Sir George said sometime later when they were all gathered in his office. "I think we've ironed out all the snags. By this time tomorrow you should be well on the way. You girls had better make good use of these last few hours of freedom, for you won't get any more for some weeks. Chris, I want to see the four of you for a final runover of your instructions, so Gill and Gail can wander off if they wish."

With a cheery wave to the male members of the crew, the girls went off in the jeep for a final swim.

Sir George and Mr. Gillanders had been over the flight program meticulously, and none of the crew had any further questions to ask. The little group was about to break up when the telephone rang. Benson picked up the instrument and spoke briefly into it. Then he was silent, and as he listened the others saw a look of consternation on his face.

"Is she hurt?" he snapped into the phone. Then, "Thank God for that."

He put down the receiver and looked around the room. "They had a flat tire — the jeep went out of control, overturned, and one of the girls has a broken leg," he announced.

6

It was a great shock to Chris and his friends. During the last few weeks they had become attached to these girls, so unusual and yet so friendly. They had spent so much time together that the twins were now part of their team. To hear that there had been an accident and that one of the girls had been injured, upset them more than they cared to admit.

"Where are they?" Serge asked.

"Just being taken to the hospital," Benson answered tensely. "I'm going."

"So are we," Chris said, and all moved swiftly to the vehicles waiting outside.

No one spoke during the short trip to the hospital attached to the great rocket base. Each was busy with his thoughts which were primarily concerned with the girl who was hurt. However, the fact that the accident would seriously affect the launching plans did force itself upon them.

Which of the girls had been injured? The telephone message hadn't said. Was it Gill or Gail? If it was Gail who had broken her leg she certainly couldn't go on this mission to Mercury. But if it was Gill, then Gail might still accompany them provided there were no other injuries. Gill, they supposed, would still be able to receive and transmit messages even though her leg was in a cast. By the time the jeeps stopped outside the hospital the whole party was in a state of nerves.

Benson raced up the steps, closely followed by the four astronauts. Inside the swinging doors a white-coated doctor came forward to meet them.

"Where are they?" snapped the Director.

"The injured girl is now being X-rayed," the doctor told them. "Her sister is in the recovery room. Perhaps you'd like to see her."

"Lead the way," Benson said shortly.

Followed by his young friends and preceded by the doctor, Sir George strode rapidly along a corridor until they arrived at a door labeled "Recovery Room." The doctor opened the door and stepped aside for the visitors to enter. Benson stepped through quickly, filled with concern for the girl herself and also with the effect on the Mercury project.

On a bed at the far end of the room a girl lay on a bed, sipping what looked like a cup of tea. A nurse stood by patiently. Even from a distance, the girl on the bed looked disheveled and bruised. Seeing her visitors, the girl handed the cup back to the nurse and turned to face the newcomers with a rueful smile. With a few quick strides Benson was at the bedside and even as he expressed concern over the unfortunate affair his eyes sought out the brooch which would tell him whether or not the mission to Mercury would have to be called off.

There it was. Pinned on the girl's left side was the name "Gail." Benson heaved a sigh of relief.

"How did it happen, Gail? How do you feel? Is Gill all right? Are they keeping you here long?" were some of the questions hurled at Gail by her friends. Gail was able to reassure them. She was not hurt, merely bruised and badly shaken. She hadn't heard yet about her sister, but thought she had a fractured leg.

"It all happened in a second," she explained to her audience. "I was driving along at a reasonable speed when suddenly the jeep started to pull over to the right. I tried to get it back, but the next second it had turned on its side and I was flung out. Gill was still inside and I could see she was hurt. Just then, a car came along and in a few minutes help arrived. In the ambulance Gill told me she thought her leg was broken. I expect that under the circumstances it's better her than me. This won't affect the blast-off, will it, Sir George?"

"If you'd been the one with the broken leg it certainly would," Benson replied; "as it is, we'll probably only postpone it for a short while."

"Oh, no," the girl said quickly, "I'm all right, and Gill will be able to do her stuff even if she is in a hospital bed. We'd feel terrible if this upset all your careful plans."

"I've often had to alter plans in the past," Sir George smiled ruefully, "so don't worry about that too much. But I wouldn't dream of letting you go on such a strenuous journey unless you were quite fit. That's why you've had all that intensive training."

"But I'll be all right. Really, I will," protested Gail. "I expect I'll be a bit sore in places but that's all. You will carry on with the countdown, won't you, Sir George?"

"I'll see your sister first. Then I'll see what the doctors have to say about the pair of you before I decide," Benson told her.

"This hasn't stopped us from exchanging thoughts," Gail pointed out. "We're doing it right now."

"All right, young lady. You just relax and I'll come back later," the Director ordered with mock severity.

While Chris went along with Sir George to see the unfortunate Gill, the other three astronauts stayed behind to chat with Gail.

"If I'd been the one, couldn't Gill have taken my place on the flight?" asked Gail.

"No," Morrey told her. "Gill hasn't had the training that you've had. Oh, I know the space suit and the contour couch would fit, but your muscles have all been toned up to withstand the strains of space flight."

"Why didn't Gill share our training?" asked the girl. "I've always wondered."

"Just because there wasn't room for six in some of the facilities. Remember how crowded we were in the centrifuge, and how we bumped into each other in the vacuum chamber? We couldn't have squeezed Gill in with us," declared Serge.

"Then we could have split into two parties," Gail said. "Two of you could have trained with Gill and the other two with me."

"That wouldn't work," Morrey told her. "It was essential for all five of us who are to make the voyage to train together. We have to get used to each other you know," he concluded with a smile.

"But suppose, after all, that Gill did go instead of me, what effect would the journey have?" the girl persisted.

"She'd have a very uncomfortable time," answered Serge, "and she might even be affected permanently. In any case she'd probably be quite useless for anything except transmitting those messages of yours."

Meanwhile Chris had accompanied Sir George Benson to another part of the hospital. After a few minutes' delay they were shown into a small room and asked to wait again. It was a full fifteen minutes before they were led away to a ward containing some twenty beds. On the right just inside lay Gill in a bed strangely distorted by a fracture cradle. With a warm smile the girl greeted her visitors.

"How do you feel?" Chris asked anxiously.

"Not too bad," Gill managed to answer. "I feel just a bit dopey from the anesthetic they gave me while they put on the cast."

"We won't stop long," Benson said, "but I'll be back a little later."

"I'm sorry about this," Gill whispered. "Still, it won't make any difference to your plans, will it?"

"I don't know yet," the Director answered firmly. "After seeing the doctors about the pair of you I'll decide."

"That's what Gail told me you said just before they gave me the anesthetic," the girl in the bed managed to smile. "So you see, we can still operate."

"I don't doubt it," Benson sighed, "but there are quite a number of things to consider. Be patient, and I'll let you know as soon as I can."

"What do you think, Uncle George?" Chris asked as they walked back down the corridor.

"A cancellation or even a postponement would be a heavy blow," Benson admitted. "I might even have to consider sending you without the girl and letting you use the radio. This, I admit, would be a great disappointment, because I have a feeling that in telepathy we have something new and exciting – at least as far as space travel is concerned."

"This looks like a doctor coming. Perhaps we can learn something from him," Chris said.

"Ah, Sir George," the doctor exclaimed, "I was coming to find you. Will you come to my office?"

"Lead on," Benson told him.

On the doctor's desk were the X-ray films of the injured girl. He picked one up and held it in front of a viewer.

"Just a simple fracture in the shaft of the femur. Should take about six weeks to clear up," the doctor told Sir George and Chris. "We'll need to keep her here for about a week. Then she can leave."

"You want to keep her a week, eh? What about her sister? Have you examined her?" the Director asked.

"Yes. No injuries, just a shaking. She can leave anytime now," the doctor answered.

Then Benson asked the vital question.

"Tell me, Doctor," he said, "do you think Gail – that's the uninjured one – will be able to meet the deadline tomorrow?"

"How long have we got?" the doctor asked.

"Eighteen hours," Chris told him.

"Yes, I should think so," the doctor said. But he sounded a little doubtful. "Of course a lot depends on how the girl herself feels. If she's willing to go, I have no objections."

"Thank you, Doctor. Now about the injured girl – Gill. Could we possibly move her – still on a bed, of course – into Control? You know what a vital part she has to play in this next venture?"

"Yes, I know. Well, if she has constant medical supervision, I don't see that there's much difference between lying in bed in a ward here, or in a room at your Control center."

"Thanks, Doctor. We'll move her just as soon as you give the word. Perhaps you can provide whatever medical attention she needs. If we do carry on with the countdown, I don't want either of these girls injured!"

When Chris and Sir George returned to the room where Gail was, they found her sitting on the side of the bed surrounded by the three astronauts. She was laughing and joking with the young men as if nothing had happened, though occasionally she did give a grimace for she had a few sore spots. They all turned eagerly to Sir George as he came in.

"Is it on?" asked Gail quickly.

"Not so fast, Gill – er – sorry, Gail, I should still get you mixed up but for your brooches. As no doubt you know already I've seen your sister. She's as anxious as you are for the mission to proceed. She has a simple fracture of the femur and it should heal without difficulty. There's no reason, so her doctor tells me, why she shouldn't be moved to the Control buildings. And it certainly can't harm her leg to pick up messages from you. I think you will be the deciding factor rather than your sister. Are you fit enough to undertake the journey? That's the real problem."

"Of course I am," Gail insisted. "You try me and see."

"You can all stay here if you wish," the Director said. "I'll be back within the hour. Then I'll be able to let you know whether the mission has been canceled, postponed, or whether the countdown is still on."

With that Chris and the others had to be content. It would be a great shame if Sir George decided to proceed without the twins. Tony was the only one who had some reservations concerning the new crew member. After so many weeks of training they all knew what a great disappointment it would be to Gail if she were left behind.

"Cheer up, Gail," Morrey said in an attempt to appear lighthearted. "I think Sir George will be most reluctant to modify the flight plans at such short notice."

"Why couldn't he have given us the go-ahead right away instead of going back to Control?" the girl asked despondently.

"When you know Uncle George as well as we do you'll realize how much he hates to make sudden decisions." Chris smiled. "My guess is that he's gone back to Control to find out what the consequences would be if the time of the blast-off were delayed. He likes to consider all the facts before making up his mind."

"What would be the consequences of a delay?" Tony wanted to know.

"The whole flight program would, of course, have to be recalculated. As Mercury is moving quite rapidly it might increase the distance from Earth considerably. Then again, a delay of any magnitude might run us into a period of sunspot activity. Obviously tomorrow must be the best possible date for launching. Otherwise it would never have been selected in the first place."

Chris had stated the facts so plainly that there was nothing anyone could add. All they could do now was to await the return, and decision, of Sir George. Gill was impatiently demanding news from her sister, and Gail sent her thoughts out to her twin telling her of the suspense they were now in.

Tony was constantly going to the door to see if Sir George had returned. Finally they heard him shout, "He's coming!"

The footsteps of the Director could be heard approaching. In seconds he stood in the doorway facing the tensely waiting crew.

"The countdown is on!" he declared.

7

It was 8 A.M. – or, in astronautical terms, T minus two hours. Chris and his crew were waiting for Gail. Sir George Benson and Mr. Gillanders were with them, but no one seemed to have much to say.

The final briefings had been given; the last tests of the ship and all its equipment had been made; the crew had taken leave of all their friends in Control. As soon as Gail had said farewell to her sister the little party would put on their space suits and be driven out to the launching pad.

"Here I am," the girl called as she entered. "Gill is quite comfortable, though she's disappointed she won't see the lift-off. Still, she won't be lonely. She has half a dozen of your staff with her, Sir George, besides a doctor and nurse. There's quite a bit of apparatus in the room, too."

"Yes, tape recorders and telephones. Hope they won't bother her, or that she won't feel the room is too crowded," Benson said.

"Oh, no. She's loving it, being the center of attention. I've just asked her and she feels fine," Gail assured the Director.

"Ask her to tell one of the men to call me here on the phone," Sir George requested.

In less than a quarter of a minute later the phone rang and Benson picked it up. It was indeed one of the engineers who'd been installed in Gill's room. The Director asked various questions about the phones and recorders, but Chris guessed that this had been Uncle George's final test of this strange means of communication.

"Off you go now to get into your suits," Benson commanded. "I'll see you out on the pad."

Mr. Gillanders led the little party to another room where the complicated space suits lay. Helped by a number of technicians Gail and the young men climbed into their suits, tried on their helmets and tested their radios. All was well, so they removed the helmets again and exchanged jokes with the men around them. Then the big Australian looked at his watch.

"T minus sixty-five minutes," he announced. "We'd better be off."

Rather clumsily the five space-suited figures clumped their way to the door and were assisted into the special vehicle waiting to take them out to the launching pad. Again there were cheerful farewells and the vehicle began to move.

As they trundled along the road out to where their ship would be waiting, Tony couldn't help looking at Gail. Though she tried to conceal it, the girl seemed tense, and she was certainly a bit pale. Ought he to say a word to

Chris? It was still not too late for the girl to drop out. It would be better for her to withdraw at this fifty-ninth minute of the eleventh hour rather than go on and crack up during the mission. With fifty minutes to go before blast-off, Gail could still tell Sir George that she was unable to proceed. Although it would cause consternation among the planners, this was far safer than a breakdown during the voyage.

The girl must have felt Tony's eyes upon her, for she looked up at the mechanic and managed a brave smile. Maybe he'd been imagining things; Gail was certainly plucky. This was her first space flight. No wonder she felt tensed up. Tony could remember his own deep hard-to-conceal fears when he was setting forth on his first trip. No, he couldn't embarrass Gail by saying anything to Chris. Instead he would make it his job to keep a close watch on her.

"Here we are," Mr. Gillanders announced as their coach came to a standstill. Outside they could see the towering structure of the gantry with *Mercury I* standing proudly beside it. Again with many willing helpers, the five left the vehicle and walked the half dozen yards to the elevator.

This was it. No rehearsal this time, but the actual thing. Tony was watching Gail as they all took those few fateful steps. One – two – three – four. Did he see the girl falter? Politely her male companions stood aside to permit Gail to step into the elevator first. The die was cast.

Sir George Benson was waiting on the platform above. As each astronaut arrived the Director greeted him. For the girl there was a special word of encouragement, and for Chris a quick glance that meant a great deal. Always these last few moments, when crews took leave of their earthbound companions, were difficult. Emotion must be re-pressed, a cheerful manner and a "see-you-again-soon" attitude was the order of the day. Everyone tried to give the impression that this flight of the space ship was just a routine affair and that this journey to the Sun's nearest planet was a dull, everyday occurrence. But deep down in the hearts of both crew and their helpers was the knowledge that some frightful catastrophe was always possible. It might be that these five young people, now being assisted into the space ship's cabin, would meet disaster and never return to Earth.

For the Director of UNEXA the moment was especially poignant. He had full responsibility for having planned the mission, for the job of supervising the construction of *Mercury I* and the preparation for its hazardous journey. And it had been his decision to proceed with the countdown. In thirty minutes from now these young men and this girl would, on his orders, be hurled into space on a mission that was fraught with unimaginable dangers.

Chris and the other four were busy settling on to their contour couches. Technicians in white overalls were giving a last look around the cabin. Finally Sir George and Mr. Gillanders peered in at the open hatch.

"Have a good trip," the Australian called.

"Safe return," Benson said quietly.

And then the hatch was closed. The outside world had gone, and the five people, lying quietly on their couches, were alone in the small cabin. In twenty minutes' time, if all went well, the ship would rise slowly from the launching pad to carry them to Mercury. They would come closer to that great ball of fire, the Sun, than any human being had before.

In a quiet room in Control the other Patrick twin lay in her bed propped up with pillows. She was pale, and her doctor wondered whether this was due to her recent accident or to the concern she felt for her sister about to embark on such a risky journey. As the twins had always been so close there was little wonder that the one left behind felt deeply about the sister setting off some millions of miles into space.

A phone rang and one of the scientists sitting at a table spoke into it quietly. Then he put it down gently.

"It's over to you now, Gill," he said to the girl in the bed. "The link with *Mercury I* has been cut. You are our means of communication."

The girl nodded. She was fully conscious of her responsibility both to her sister and the other members of the crew, and also to the scientists who were testing this new means of communication.

"I'm ready," she said simply.

One of the men in the room switched on a tape recorder to preserve every word that Gill said.

"They have just closed the hatch and they are all lying on their couches," she began. "Gail wants to know if I will give them the countdown."

The flick of a switch brought in a voice from the main Control room.

"T minus eighteen minutes," it said.

Gill's eyes seemed to fix for a moment as she passed the information on to her sister. Actually there was no real need for it because Chris was watching the ship's chronometer and he knew the exact moment of blast-off. However, the leader knew from experience how terrible these last few minutes could be. He must give Gail something to do even if it wasn't actually necessary.

"Ask Control to let me know when Sir George Benson is back," he said.

Obediently Gail transmitted the request and Gill flashed back the answer: "Will do."

What could Chris give Gail to do? At this stage there was little need of communication, but to occupy the girl he called out the readings of the many instruments above his head and made her repeat them to Control.

Back in the building Gill called out the string of readings she was getting from her sister. The scientists were recording her words while the doctor and the nurse kept a watchful eye on their patient to see if this mental activity had any harmful effect. Apparently Gill was all right, for her work was allowed to continue without interruption.

"T minus ten minutes," the voice from Control said suddenly. Gill sent the information back to her sister.

In the cabin there was a lull. All the readings had been transmitted to Control, but there were still eight of those endless minutes to get through. Morrey attempted a bright description of his first take-off, and then Serge did the same. Meanwhile Tony, who was on the couch next to Gail, lay watching the girl closely. Soon it would be time to fix on their helmets, but meanwhile he could see Gail's face clearly. He was sure that she was pale with anxiety, and that the jerky way she talked betrayed the tension she must be feeling. Tony supposed it was natural enough, though the girl had been well trained, she had made a trip to the Moon, and should know what to expect. Even though there was nothing on Earth which could quite reproduce the conditions of a long space flight, they had come very near to it. So anyone who had been fully prepared shouldn't have many fears about what they would encounter. Perhaps girls were always a bit scared, Tony thought.

"Helmets on," Chris ordered, and as he did so Gail reported that Sir George Benson and Mr. Gillanders were back in Control.

The next minute was spent in securing the helmets, and again Tony noticed the girl fumble more than she should. After all, she'd put it on scores of times and ought to be able to do the job automatically. He was about to lean over and help her when he saw that at last she'd succeeded.

"Everyone receiving?" Chris asked.

He was testing the helmet radios by which the crew would talk to each other while wearing their headgear. In turn each one assured their leader that all was well.

"Sir George says the gantry is being removed now," Gail reported over her radio.

"That means three minutes to go," Morrey observed cheerfully. "Give our regards to everyone in Control, Gail, especially to Gill."

"Gill says she wishes she was with us," Gail told them all a few seconds later, "Mr. Gillanders is staying with her till after burn-out."

The girl was referring to the moment when the last part of the launching had been completed and the third of the chemical motors had burned out and had been jettisoned. By then they would be truly on their way to Mercury.

"One minute," Gail announced to her companions, and Tony—perhaps because he was on the look out for it—detected just a faint quiver.

"Chin up, Gail," the voice of Morrey exhorted cheerfully. "You'll find it's not too bad and is soon over."

"I—I'm not scared," the girl said. "It's just that I don't want to let you down."

"You won't," Chris told her firmly. "You're doing fine."

"I've got to try and send messages while we are accelerating," Gail said. "Is there anything you'd like me to say?"

"No. Just pass on your own feelings," Chris suggested. "As you know, talking's a little difficult under pressure."

"Fifteen seconds," she said in a strained voice.

Nothing more was said. This was the critical moment. In a few seconds the silver monster would heave itself from its concrete bed – or it would disintegrate in one great flash. Fortunately, disasters were rare, but they did happen, and the most experienced astronaut breathed easier when he felt the ship begin to move beneath him.

In Control the last ten seconds were being counted. There, too, the inevitable strain was visible even among these hardboiled men who had sent a score of expeditions on their way.

"Zero."

The emotionless voice called out the fateful word and the red firing button was pressed. Through a slit in the concrete wall Sir George Benson watched the distant ship anxiously. A huge cloud of steam and smoke was billowing up from the base of *Mercury I.*

In the room where the injured girl lay with her leg in a cast the little group of men and the nurse were watching the patient closely. Gill was evidently in close communication with her sister and seemed to be sharing Gail's anxieties. Her eyes were fixed on a point on the ceiling. For a few moments she seemed oblivious to the others around her. As the loudspeaker announced the signal to fire, Gill seemed to shudder and there was a suspicion of perspiration on her forehead. Even the muscles in her face seemed to tighten in sympathy with her sister away in the space ship.

"Remarkable," the doctor murmured to himself as he studied the girl closely. He couldn't help wondering whether Gill would survive if anything happened to Gail.

The girl's mouth began to work and to go into some strange shapes as if she was struggling to speak against some overwhelming force.

"We're – off!" she managed to gasp; and gradually the strain went from her face as the critical moment passed.

Yes, *Mercury I* was off!

The few seconds following the ignition of the rocket motors seemed like a century to the people inside the cabin. Then they all felt the slight quiver as the giant space ship began to raise itself from its concrete bed. Once the ship had started to lift the pressure on the astronauts increased rapidly. The roaring chemical motors punched ship and crew into the heavens, and, with a pressure upon them of seven times that of earthly gravity, the crew were forced hard against their contour couches. This pressure was much greater than for a Moon trip, but not so high as they'd had on the centrifuge.

How was Gail making out? Chris wondered. Was she managing to get anything through to her sister? Or did this tremendous thrust paralyze her telepathic faculties as it prevented speech? By now *Mercury I* must be getting smaller to observers back at Control. Soon it would be a tiny speck disappearing into a blue sky. To those inside the cabin the next few minutes would be extremely uncomfortable, and but for their training, their space suits and the contour couches they could not have survived.

Precisely on time the pressure ceased momentarily, and then it began again. This was the first stage motor burning out, falling away, and the second stage motor taking up the thrust. Some time later this was repeated as the second stage handed over to the third. At last all motors had completed their tasks and *Mercury I* was speeding on its tremendous journey. As the thrust of the last motor died away the crew could relax and leave their couches, and the first thing that Tony did was to turn and look at the girl.

"Chris!" he called out in alarm over the helmet radio. "Look at Gail. There's something wrong with her!"

8

The girl in the bed was in obvious distress, and the doctor and nurse bent over her anxiously.

"I – I can't get anything from her," she gasped. "What's happened to her?"

In vain the doctor tried to reassure her, and Mr. Gillanders suggested that Gail had probably fainted.

"It often happens under high acceleration," he said. But Gill was not to be comforted.

As quickly as they could, Chris and the others removed their helmets and released themselves from their couches. As soon as the safety straps were unfastened the most fantastic thing happened. The astronauts floated out of their couches!

However, there was no thought of performing the usual gyrations that most space travelers went through during the first exhilarating moments of free fall. For now that the last booster had finished its job the space ship was coasting along in a weightless condition. Instead, all four crewmen bent over the still form of their companion as they hastened to remove her helmet. While Morrey gave the girl a whiff of oxygen Chris administered an injection and Serge and Tony massaged her hands.

At last Gail's eyes fluttered open. For a moment they looked blank. She tried to speak, but then her memory came back and she hesitated before apologizing for her lapse. Chris and his companions were greatly relieved at the girl's recovery, though Tony felt it confirmed his fears that she wasn't really fit enough to make the journey.

"Will Gill know you've passed out?" Chris asked. "Better let her know you've come around."

"I have," the girl announced, her voice growing stronger as her recovery proceeded. Then she noticed that her four companions seemed to be floating about, and how funny they looked! Gail's face began to work and she suddenly let out peals of laughter at the strange antics of her traveling companions.

It was good to hear her so amused, for if her sense of humor had returned there wasn't a great deal wrong with her.

"All right. Wait till we've unfastened your straps," Morrey said in mock anger.

When Gail was freed she felt lighter than a feather. Involuntarily she raised her arm to free herself from the couch. Though she'd been expecting strange things to happen she wasn't prepared for the way her arm flew up. Without weight, her arm hadn't required the usual amount of muscular effort to move it. Its momentum even carried her up from the couch and across the cabin. Had Serge not grabbed her as she sailed past, Gail would have collided with the wall.

To the amusement of the others the girl held on to her rescuer and the pair of them went cartwheeling around the cabin like two pieces of thistledown. As they touched one of the walls Gail seized a projecting handle and clung on to it tightly. She wasn't looking quite so amused now. No doubt her short Lunar journey hadn't been long enough to accustom her to zero gravity.

"You'll soon get used to it," Morrey assured her. "Better move slowly till you get the hang of this weightless feeling. After that it's really a lot of fun. We always enjoy it, don't we?"

The other three astronauts confirmed that living under zero gravity was quite pleasant. Under their coaxing Gail released her hold and found herself hanging freely in the air. Even breathing out was sufficient to propel her gently backward because of the jet effect of her expirations. Under the guidance of her experienced friends Gail made a number of experiments and was soon cavorting about the cabin as gaily as the others.

"Now if you've all finished your aerial acrobatics we'll get down to work," Chris said gently. At once the trained astronauts became efficient machines. Under their leader's instructions they commenced the routine work which would enable Control to compute their exact position. After reading the various instruments and preparing his report, Chris gave a written sheet to Gail.

"Get this through," he said.

Here was the girl's first real test. Not just a lighthearted comment, but a message full of technical jargon. This information would be fed to the huge computer at Cape

Kennedy. In a very short time Sir George would know if *Mercury I* was on its correct course, and, if not, what maneuver would bring it back. Any break or mistake in the transmission would cause a serious error in the computer's answer. The result would be that their ship would go hundreds of thousands – perhaps millions – of miles off course. In the end they would be lost in the vast emptiness of space.

Gail read Chris's notes through carefully, for she knew how much depended on it.

"I think I'll get back on the couch," she said. "Then I can relax and get on with the job."

"No need to lie on the couch to relax," Serge pointed out. "You just float in the air like a soap bubble."

"I'd prefer to be a little more secure," answered Gail, so, with Morrey's assistance, she returned to her couch and was fastened in. Occasionally reading from the notes the girl lay back with her eyes looking right ahead at nothing in particular. Chris was watching the process with great interest. Even now it was hard to accept such an unscientific means of communication. Though perhaps that thought was unfair. Was it really so unscientific after all?

Gill and her retinue were ready for Gail's message. The girl in the bed had been very distressed while her sister had been unconscious. Only when Gail revived did Gill feel happy again, and the girls must have assured each other that all was well, for Gill seemed happy and anxious to get on with her part in the experiment.

In a monotonous voice the girl in bed repeated a string of facts and figures. Everything was recorded. To Mr. Gillanders the information Gill was repeating seemed genuine enough. Certainly she couldn't have invented it. He doubted whether she had the ability to reel off these readings so glibly, or indeed the technical knowledge that could deceive all these scientists who were listening so intently to her recital.

At last Gill fell silent and then seemed to become conscious of her surroundings.

"Was that all right?" she asked, a trifle timidly.

"Fine, just fine," Mr. Gillanders told her enthusiastically. "We'll rush this through the computer and Sir George will soon know if our friends are on the right course."

Less than a minute later Sir George Benson was watching the data that had been rushed in and fed into the huge mechanical brain. It took the computer precisely twenty-one seconds to start punching out the answer. When it had finished the Director carried the card to his desk and studied it thoughtfully. It seemed all right to him. *Mercury I* wasn't quite on its correct trajectory. He'd have been rather surprised if it had been. Indeed space shots usually had to be corrected.

Sir George himself took the reply into Gill's room. He smiled encouragingly in answer to the girl's anxious look.

"Can you get this back to them?" he asked, passing his instructions to her.

Gill read the paper through, but didn't understand a word of it.

"I'll try my best," she promised.

In the cabin of the space ship *Mercury I,* the crew was waiting for the outcome of the experiment. Gail seemed to have done her part in sending out the data which, together with information from tracking stations back on Earth, would tell Control their exact direction, position and velocity. At this stage of the venture it would not be possible to assess the speed of telepathy as compared with radio. The ship was still far too close to Earth for any appreciable time lag between transmission and reception.

Only when the first million miles had been covered would it be possible to judge the value of this strange procedure.

"What's our velocity now, Chris?" asked Tony as they waited to see if Gail would pick up their instructions.

"Twenty-one and a half thousand miles an hour," the leader replied, "which is just about what it should be."

"When do we switch to the ion motor?" was Tony's next question.

"Sir George decided we'd make any necessary flight corrections first," Chris replied, "and that depends on Gail."

This is ridiculous, thought Tony to himself. If we had used radio we'd have known without a doubt that our message had gone through, been received correctly, and replied to promptly. Now we can't be certain.

Even as Tony was having these doubts the girl began to speak. In the flat, monotonous voice both girls used when they were repeating messages received, she let out a string of instructions which Chris noted down carefully. As he looked at the result he was quite impressed. This was just the type of directions he would have expected by the more usual means.

So *Mercury I* was slightly off course, was it? From the message relayed by Gail the three astronauts, Chris, Morrey, and Serge judged that the error was not large. It merely required several short bursts from a few of the lateral jets to turn the ship into the correct direction.

"Are the figures I gave you correct?" Gail asked her companions.

"Seem all right to me," Morrey assured the girl with a broad grin. "If you've made a mistake we might end up in the middle of the Sun instead of in orbit around Mercury."

"You don't really mean that, do you?" Gail asked, aghast.

"Sure I do," the American said looking as solemn as he could. "If you've got the 'gen' wrong we'll miss our target, won't we?"

"Don't worry, Gail," Chris interposed. "At this early stage we can make a number of corrections to our direction. We'll probably have to make several in any case."

"So if – if there is an error in what I've given you, it won't jeopardize the expedition?"

"No, though of course each subsequent correction is more important and the accuracy of the instructions more vital," Chris told her.

"Shall I release myself now?" Gail asked as the crew prepared to adjust the ship's course.

"If you like – but be careful," warned Chris.

"Your last chance to float around," said Morrey. "Soon we'll be switching on the ion drive and then we'll all be under a thrust again."

Carefully the girl unfastened her safety harness, and while Chris and the others were carrying out the instructions she had brought them, she amused herself by propelling herself about the cabin. Would she ever get used to this weightless condition? she wondered. Though she knew that the ship was streaking along at some twenty thousand miles an hour, it seemed to be quite motionless. There was no sensation of movement in the cabin. Though her eyes told her which was the floor of the cabin "up," "down," and "sideways" had lost their meaning.

"Watch it, Gail," called Serge, and while the girl held on to her couch the lateral rockets were fired. The ship was slightly turned as instructed by Control. Further checks would determine if *Mercury I* was now on its correct course.

"Report to Control that the adjustment maneuver has been completed, and that we're starting up the atomic motor," Chris called across to Gail. Obediently the girl sent her thoughts winging across space and immediately received back the answer, "Okay to proceed."

The crew now busied themselves with starting up the ion drive. This form of propulsion, based on the energy of the atom, was an essential for all space journeys of any length. Though the thrust from an ion motor was small as compared with that of the latest chemical giants, it was capable of being applied almost indefinitely. An acceleration of one-fifth of that of gravity on Earth – about four miles per hour for each second – can, when applied over long periods, build up the fantastic velocities necessary to cover the vast distances to the planets.

"That's it," Morrey said cheerfully.

There was no need to explain that he was referring to the ion drive. No longer could Gail and the others float about gracefully or otherwise. Instead the gentle thrust of the new means of propulsion landed them lightly on the cabin floor.

"We're now under almost the same gravity as on the Moon," Chris explained. "It will be like this the rest of the way, so you'll have to get accustomed to it, Gail. We've been to the Moon base at Lunaville many times, so we know all about it."

"And don't forget we've done a good few weeks in a ship under ion drive," Tony chimed in.

"That was when we made that awful journey to Jupiter," Chris added.

"Anyway, it's easier in some ways than being weightless," Serge observed. "Makes eating and drinking a little simpler."

"How's that?" asked Gail.

There was a moment's silence in the cabin. Gail wanted to know why it would be simpler to eat and drink under gravity, light though it may be, rather than in free fall. The four astronauts looked at their companion strangely. Why had she asked such a question when the answer had been given to her a score of times during training? Had she forgotten? Had something happened to her memory? What about the voyage to Lunar City?

To end an awkward moment Chris rapidly explained that under zero gravity liquids disintegrated into innumerable droplets, and food had to be fairly solid. In free fall liquids had to be squeezed directly into the mouth from plastic tubes. Food was also likely to come floating out of the mouth given half a chance. But why had Gail forgotten this when she'd already drunk from plastic tubes during training?

Tony looked at the girl darkly and his misgivings increased.

9

"It seems to be working all right so far." Mr. Gillanders was saying to his chief. He and Sir George Benson were comparing notes some six hours after the launching of *Mercury I*. After the strain and excitement of the period just before and after blast-off, Control had now entered a quieter time. Benson and his deputy were relaxing over a cup of coffee — their first refreshment for over eight hours.

"I agree," Sir George said, "*Mercury I* changed course as instructed and is now on a reasonably correct path. Information seems to be passing both ways satisfactorily."

"The data received by telepathy agrees very closely with that received by telemetry," Mr. Gillanders added. "The girls seem to have no difficulty in communicating with each other in spite of the increasing distance."

"Keep a close watch on it, Billy," Sir George said. "The moment the girls falter we must resort to radio. As soon as you can, arrange for the girls to have a long rest period. We don't want to risk a falling off in their performance because of fatigue."

"Of course not," the Australian agreed. "Actually we shan't require much more information for about twelve hours. They may as well have a sleep now. I'll let them know."

"Gill says we can have a spell off duty," Gail informed her companions. "I must confess I feel a little tired."

"Have some food and then try to sleep," Chris suggested.

The girl smiled gratefully. All the astronauts were most considerate except, perhaps, Tony who, she'd noticed, often looked at her coldly. As she relaxed on her couch the girl looked uneasily at Tony. She was a little afraid of him.

"What will happen," Tony asked Gail, seeing her eyes on him, "if Sir George wants to send us a message while you are asleep?"

"Gill would wake me up," the girl replied with a forced smile. "We've done it many times."

"So there's no need to worry, is there?" declared Morrey, becoming aware for the first time of the slight tension between the girl and the mechanic.

Because *Mercury I* was under the low thrust of the ion motor, there was no need for Gail to fasten her safety straps. Yet in spite of the comfort of this added freedom she didn't go to sleep for a long time. Instead she lay thinking about her sister, about Tony, about Chris and Serge, and about Morrey.

Life on the space ship settled into a well-tried routine. The four astronauts worked together smoothly like the experienced team they were. Gail silently admired their calm efficiency and complete mastery of their jobs. Who could help but be confident when in the company of four such competent young men?

Hours passed and the girl had fallen asleep. Chris and Tony too were taking a rest period, while Serge and Morrey moved silently around the instruments, occasionally making notes. *Mercury I* had been in flight for twenty hours, and it had now reached the tremendous velocity of 250,000 miles an hour under the gentle, but persistent, thrust of the atomic motor. Still, to those in the cabin, the ship seemed to be motionless.

"Two and a half million," Morrey whispered to Serge. He had no wish to waken his friends in telling the Russian how far the ship had traveled on its long journey.

Quite suddenly Gail sat up. A message from Gill had been hammering away inside her head and had compelled her to wake up. It was a routine request for information, and Morrey guessed that the real purpose had been to test the twins and their ability to communicate when the receiver was asleep. Morrey and Serge prepared the reply and Gail settled down to "think" it back to Earth.

"Sir George should soon be able to tell if telepathy is any quicker than radio," Serge whispered to his colleague as they resumed their duties. "If we're two and a half million miles on our way, radio signals would take just over thirteen seconds to reach us, so a reply would take a minimum of twenty-seven seconds. Can telepathy beat that?"

The rest spell for the two girls was over. Both at Cape Kennedy, and in the speeding space ship, the Patrick twins were preparing themselves for another session on duty. A careful examination by the doctor had confirmed the fact that Gill was mending nicely and she seemed none the worse for her task of projecting mental communication across space. Gail, too, felt refreshed after a sleep, and as there was nothing she could do to fly the ship, she was keen to get on with the job for which she'd been selected.

A long, routine message was Gail's first task, and this was acknowledged by her sister in Control. Then came a flash from the Cape urgently requesting the pressure reading inside the cabin. For a moment the girl wondered if something had gone wrong, but the calm efficient way in which her companions were performing their duties quickly reassured her.

"Just a time check," Morrey ventured.

The American was right. Now that *Mercury I* was sufficiently far away for an appreciable time lag between transmission and reception of radio waves, Sir George Benson felt that the time had come to put the telepathic system of communication through its most crucial test. These tests would determine whether telepathy was going to be a new and vital tool in the exploration of space or be relegated to the entertainment field and party games.

Without warning to Gill, Sir George pushed a slip of paper in front of her. On it were the words: "Urgently require atmospheric pressure reading in cabin." Startled, the girl sent her thoughts to her twin. The answer came back almost at once.

"Seven hundred and fifty millimeters," she told the waiting scientist. Mr. Gillanders was in the room too. He held a stop watch in his hand, but Gill hadn't seen it. But there was no need to refer to the watch. Mr. Gillanders and Sir George were both amazed and delighted with the result of this test.

"Eight seconds," whispered Gillanders.

"Incredible," breathed the Director. "By radio it would have taken twenty-seven seconds."

So far, at least, it seemed that Sir George had been justified in testing a process many people considered merely a stunt. If other tests, over even greater distances, confirmed this result, then it would seem that telepathy was just what astronauts needed.

"It's all right, Gill," Benson assured the girl. "There's nothing wrong. We're just checking to see how long it takes to send an urgent message and get a reply back."

"Was the result satisfactory?" the girl asked anxiously.

"I'll say it was," Mr. Gillanders declared enthusiastically. "If we could travel as fast as your thoughts we'd reach the stars in no time."

"Tell me, Gill," Sir George said, "is there any lessening in the force or clarity of your sister's messages as the ship gets farther away?"

"I haven't noticed any," the girl assured the Director. "If I do I'll certainly let you know."

"Gill says that was a test message," Gail burst out to those in the cabin, "and it took eight seconds instead of twenty-seven by radio."

"How about that!" Chris exclaimed happily.

"Good work, Gail," Morrey told her.

Serge, too, offered his congratulations on the apparent success of the experiment. Tony, however, deliberately occupied himself with freeing a valve which seemed to have become stuck. He wasn't at all happy, for it probably meant that he and his friends would be stuck with one of the girls on all their future excursions across the solar system. Not that he disliked the Patrick twins, but it wouldn't be the same with Gill or Gail crashing into their tightly knit team.

Though Gail may not have noticed Tony's action, Morrey had, and he was annoyed. What right had Tony to resent this plucky girl's presence? She was doing a really good job, one that could revolutionize space communication. And hadn't she stood up to the rigors of the journey so far — aside, perhaps, from one or two slight lapses?

Keen eyes and a sharp sensitivity told Chris Godfrey that an awkward situation might develop. To give himself time to think about it, and to decide what to do, he diverted everyone's attention.

"Isn't it about time we had a peep outside? Will you uncover the porthole, Tony, and perhaps Serge and Morrey will rig up the telescope," he said briskly.

"Oh yes!" Gail said eagerly, "I'm dying to have a look at the stars from up here. I didn't see anything on the Moon trip. I never saw the sky once."

"I don't think you'll be disappointed," Morrey called across to her as he and Serge fixed their telescope on its mounting. By this time Tony must have been experiencing a feeling of guilt, for he invited Gail to look through the porthole, to get her first glimpse of the universe around them. Under the ship's light gravity Gail skipped across to where the mechanic was standing and looked through the glass panel he'd uncovered.

"Oh! It's just wonderful!" she gasped. "But everything's black. I thought it would be brighter than on Earth."

Chris had moved to her side and was looking through the porthole with her. The sky around them certainly looked almost black, but it was studded with innumerable points of light that shone with great brilliance. It was as if a celestial jeweler had scattered diamond dust on lush black velvet.

"I never knew there were so many stars," Gail said in wonder.

"Wait till you look through the telescope," Serge commented. "Then you'll really begin to see the universe."

"It looks black outside," Chris explained, "because sunlight must have something to illuminate before we can see it. On Earth there's the Earth itself and all the atmosphere surrounding it. Here there's nothing but emptiness, nothing for the rays of the Sun to strike. Of course if you went outside you'd see one side of our ship lit up, but nothing else. The stars you see are, of course, sources of light themselves."

"But they're so bright," the girl persisted.

"That's because there's nothing between us and them to reduce their light," Chris went on. "On Earth there are many miles of dust-laden atmosphere. Only in the vacuum of space is it possible to see what the stars and the planets *really* look like."

"Back on Earth astronomers always tried to build their observatories on the top of a mountain," Serge added, joining the conversation, "so that their telescopes are at least above the thicker and cloudier lower layers of the atmosphere."

"In recent years direct observation from observatories on Earth has almost ceased," Morrey told Gail. "Now it's all done by special satellites or from the Lunar City Observatory on the Moon."

"Where are the planets?" Gail asked. "Can we see Mercury yet?"

"Not yet," Chris told her. "It's still too close to the Sun. We'll be able to pick Mercury up when we've gone a bit farther. But look over to the right there, Gail. What can you see?"

The girl looked in the direction Chris had indicated and gasped. What she saw was the most brilliant object in the sky. It had just entered their field of vision and, unlike the stars which were mere points of light, it had size.

"A planet? she asked. "Venus?"

"Yes to both questions," Chris smiled. "We shall be passing through the orbit of Venus to reach Mercury, but unfortunately it will be some distance away."

"I've never seen anything so beautiful," Gail breathed as she watched Venus intently. It was about the size of an orange when seen a room's length away. Now she observed that it was not uniformly white, but there were delicate pink shades in parts.

"Venus looks attractive at this distance," Morrey said quietly, "but she isn't quite so nice when you get really close."

Gail looked quickly at the American, for she knew that the four astronauts had visited this mysterious planet. Sometime, she decided, she must press them to tell her all about it. Indeed she would also like to hear about Mars and Jupiter, the other planets which this intrepid crew had explored.

"Here's another interesting planet coming into view," Chris told her. Gail tore her gaze from Venus and saw an even larger object crossing their field of vision. It was greenish blue, with several brown patches. The surface was marked, and, though she didn't recognize the planet, the girl thought that its features were somehow familiar.

"What planet is that?" she asked curiously.

There was a roar of laughter from the four crewmen. When it had subsided it was again Morrey who explained.

"That is dear little old Earth," he answered, smiling.

After Gail had admired the wonders of the universe through the porthole, she was invited to climb up into the seat below the eyepiece of the telescope. Under the guidance of first one astronaut and then another, she had a close up view of some of the most breathtaking sights in the solar system. First she was shown Jupiter, the King of Planets with its attendant family of twelve moons.

"See that one?" Serge said, for it was his turn to be her guide. "That little moon just appearing from the back of

Jupiter is a particular friend of ours. It is called Io, and not very long ago it was the means of saving our lives."

Again the girl silently resolved to drag from these friends of hers an account of their astounding adventures.

"Look, that's Saturn," Tony informed Gail, for it was now his turn with her at the telescope.

"Why, its marvelous!" the girl said breathlessly. "Those rings look wonderful. What are they?"

"Probably vast numbers of tiny particles, the debris of moons that have distintegrated," Serge told her.

Chris watched his companions showing off the wonders of the sky with a proprietary interest. For the time at least all seemed well with the crew and with the girl. He was relieved, for nothing could be worse than ill feelings among people cooped up as they were. Little did the leader suspect that this was the lull before the storm, and that very soon events would occur that could wreck the expedition and cost them all their lives.

10

"That sister of mine is having a great time," the girl in bed told those around her. Mr. Gillanders had been watching Gill for the last half hour. He'd seen the changing expressions on her face as she shared in the experiences of her twin – the amazement and wonder that she'd caught from Gail. Not wishing to interrupt this close liaison which he still found hard to accept, Mr. Gillanders had waited for Gill to speak.

"What are they all doing?" he asked patiently.

"The boys have been showing Gail the wonders of the universe," the girl said. "How I wish I could have seen them myself!"

"So messages from your sister are not like firsthand experiences?"

"Hardly – and certainly not in this. When Gail gets excited she isn't very explicit. But she's told me how positively enchanting everything looks. She says she can see Earth with its continents and seas as if she were looking at a globe."

"Has she seen Mercury yet?" Mr. Gillanders asked.

"She hasn't said. Wait, I'll ask her," this astonishing girl said. "No – she's been told it's too near the Sun for them to see it just yet," she continued.

"Tell me Gill," Mr. Gillanders said. "Are you getting your thoughts backward and forward to each other as quickly as when you were both on Earth?"

The girl thought for a moment.

"I haven't noticed any difference at all, Mr. Gillanders."

"That's pretty conclusive," the Australian scientist observed. "Telepathy must be instantaneous. Otherwise you'd certainly have noticed a time lag by now."

The crew of *Mercury I* were all relaxing on their contour couches. Gail was still excited by the vision of the heavens that had been revealed to her. Now she was beginning to feel some of that mysterious attraction which the stars and planets have for adventurers in space. Often she had heard that once a person had journeyed across the threshold of space there was no turning back. The magic of the vast, empty silences acted as a magnet drawing back all who had ventured into those strange regions. No astronaut ever retired willingly. They were all hopelessly addicted to the fascination, the excitement, the wonder of this new environment.

Gail looked around at her four companions. Here was a quartet whose adventures had become a legend. Only occasionally, as when they were showing her the marvels of the galaxy, did they ever refer to previous adventures.

This very modesty, plus her own awakened interest in space, made Gail eager for information about their former journeys. Now was as good a time as any to draw it from them.

"What planets have you been to so far?" she asked, as casually as if she were inquiring in what places they had spent their most recent vacations.

"Oh – er – one or two," replied Chris, for they weren't prepared for the question.

"Which ones?" the girl persisted.

"Let me see – I believe I've forgotten," Chris said exasperatingly.

"Oh, come off it! I'll give you no peace until you tell me," Gail threatened.

"If you must know, we've been to Venus, Mars, and Jupiter – in that order," the leader admitted.

"Tell me about them. Did you land on each one?" Gail wanted to know.

"No, not on Jupiter," Morrey told her. "At least, not on Jupiter itself, though we did land on one of its moons."

"What are they like? Tell me about Venus first."

Gradually, by ruthless persistence, the girl dragged from these modest young men a partial account of their amazing adventures. Even though they made light of them, she guessed what fearful dangers they'd been in. If there were any dangerous moments ahead, who were better equipped to cope with them than this intrepid quartet? But this same quartet were wriggling uncomfortably under her questioning and the four scientists finally managed to change the subject.

"We should be reaching the halfway point soon, shouldn't we?" Serge asked with a wink to his companions. The others backed up his effort.

"Yes," Morrey said quickly. "We'd best see where we are.

It would look very bad if we overshot because we were busy chatting with Gail."

"We still have a few hours before then," Chris said, "but I agree it's time for a check."

The crew left their couches with relief, leaving a disappointed Gail behind. They read their instruments and took a number of star sightings. With his miniature computer Chris would be able to tell their approximate position. Of course it would take the giant instrument at the Cape, using data from the crew and from the numerous tracking stations on Earth, to determine the exact whereabouts of *Mercury I.*

"Send this to the Cape and ask them to give us a fix," Chris said to the girl, giving her some notes. Gail did as requested, projecting her thoughts to her distant sister and picking up the replies.

"Sir George Benson sends his regards and will let you have our position in a few minutes," Gail informed Chris some seconds later.

"Good," the leader said. "Jot down the ship's position on your notepad when you get it."

Then he turned back to his instrument panel. Morrey saw the cloud that flitted across the girl's face, and tried to cheer her up with a wide grin and a heavy wink. Tony saw this and it irritated him. Quickly the mechanic turned and left the cabin, climbing into the compartment housing the fuel tanks and his beloved valves and gauges.

"Tell them they have now reached an important point on their journey," Sir George said to Gill. "Let them know that *Mercury I* is just about to cross the orbit of Venus. That means that very shortly they will be closer to the Sun than any human beings ever were before."

"Whew!" Gill exclaimed. "Won't they be getting a bit warm?" She was no longer confined to bed but sat in a special wheel chair with her leg, firmly encased in steel and plastic, stretched out in front of her. It was still uncomfortable, but at least she was mobile, and they had promised her a visit to the control room for the critical hours when the ship was approaching its objective.

"No, it isn't the heat we have to worry about," Benson smiled. "That's all been taken care of. I wish I could feel as happy about the radiation. However Chris has strict instructions to report anything unusual, and I shall not hesitate to recall them if the solar bombardment becomes too much."

Obediently Gill Patrick sent Sir George's message instantly to her sister in the space ship; though she didn't pass on the Director's last remarks. She would know if there was anything unusual in that distant cabin. Just as one twin suffered when the other was ill, Gill was convinced she would have an awareness of any ill effects Gail might suffer from the rays of the Sun.

While they were waiting for the giant computer to do its work, Benson turned to speak to Mr. Gillanders.

"I don't think we need worry for a few more hours, Billy," he said. "They suffered no ill effects when they went on the Venus expedition. A few million miles closer it may be a different story. We can only keep a careful watch."

"My figures were pretty good," Chris declared modestly. He'd just had Sir George Benson's message and it had confirmed his own findings that they were now traversing that strip of space through which Venus whirls on its endless path. That they were now moving nearer to the Sun than any person had been before was a sobering thought. Each second that great furnace, which is the source of all light and heat on Earth, shoots thousands of tons of matter out into space. Each second their ship was being bombarded with countless high-energy particles of great penetrating power. What effect it would have on *Mercury I* and its crew remained to be seen.

"Everyone feel fit?" Chris called to the others. He explained that now that they were entering unknown regions which might have strange effects on them, they must keep a constant watch on themselves. But all assured him that they felt fine. Even Tony, emerging from the fuel compartment, confirmed that he, at least, never felt better. How could they know that the high-energy radiation, passing through their bodies in spite of elaborate shielding, was having an insidious effect?

"Look! Here it is," Serge called. He'd been taking a spell at the telescope, looking at the wonderfully clear images of the solar planets. All aboard the ship were looking forward keenly to seeing the elusive little planet toward which they were speeding. One after another Gail and the crew peered through the instrument at their objective. Not that they could observe much of it, for Mercury was showing as a slim crescent. It lay almost between the ship and the Sun with most of the visible face in its own shadow.

"We shall keep it in sight from now on," Serge explained to the girl. "Before this it has been at too narrow an angle from the Sun. We can only look at it properly when we don't have to look at the Sun as well."

"As we get nearer the crescent will grow larger," Chris pointed out. "By the time we are really close we shall see half of the planet."

This sight of Mercury stimulated the crew of the space ship, and for some time they discussed the mysteries of the planet. Gail excitedly described her first view of the planet to her sister on Earth.

"I think we'll soon be turning the ship around," Gail told her sister. "That will mean we're over halfway there."

Gill replied with a string of figures from the Cape's computer. In effect they said that in two hours, thirty-one minutes the crew must turn the rocket through 180 degrees so that the ion motor would be thrusting against the line of flight. Gradually the ship would be decelerated as it drew nearer to the hot little planet.

There was no longer much to do. Until the correct interval had elapsed the crew would have to exercise patience. Every gauge, meter, valve, and instrument had been checked and double checked. For the twentieth time Chris looked over the bank of small switches that would set off the lateral rockets. He knew exactly which switches he would have to press and for precisely how long. Now Gail and the four astronauts had nothing to do but watch the slow sweep of the hands of the clock.

"This is the worst time," Morrey told the girl. "A large part of a space pilot's job is doing nothing. You can guess how hard that is on a really long voyage."

"I'd probably go off my head if it lasted too long," Gail said.

"But your training should help you," Tony pointed out.

"Oh – er – yes, you mean the spells in the isolation chamber? But that was not like the real thing, was it?" Gail said, a slight flush spreading over her face.

What does the wretched girl expect? Tony asked himself. She knew from the sessions we had in the isolation chamber what it's like to be penned up in this cabin. Thank goodness we didn't have her with us when we went on that really long trip to Jupiter!

After what seemed an age of clock-watching Chris suddenly gave a sharp command. While he studied the ship's position relative to the position of the stars, Serge and Morrey operated the lateral rockets which would start and stop the turning motion of *Mercury I*. As soon as Serge pressed his switch the crew felt the ship move. Warned by their leader, they were all holding on to some part of the cabin wall. Otherwise they would have been thrown to the floor as the small rockets began to kick the ship around. Very quickly Morrey fired his rocket and again there was a kick but in the opposite direction.

The job was done. Chris announced that *Mercury I* had turned in a semicircle. To those in the cabin there seemed no difference. The thrust of the motor was just the same, giving the same low gravity as before. Gail could scarcely believe that her feet were now pointing in the same direction as her head had been a few moments before, that the planet now lay beneath the cabin floor instead of up above.

"We're halfway there," Morrey exclaimed. "It hasn't been too bad so far, has it?"

Now why had Morrey said that? Chris wondered. Maybe it was to encourage the girl. It couldn't be to reassure himself, could it? The astronaut, for some reason, felt a little uneasy. He was always sensitive to "atmosphere" among his companions, and he could feel something he couldn't quite understand. It annoyed him to think that either something was wrong with the other members of the crew – or with himself for imagining it. The moments of strain between Tony and Gail returned to his mind. Maybe this wasn't going to be a happy trip after all.

Yet there was little on which Chris could put his finger. There hadn't been any open hostility between the mechanic and the girl—just an occasional inflection of the voice, perhaps; denoting impatience. On the other hand, the girl's relationship with the other members of the crew was excellent. Indeed, he smiled a little to himself as he thought of Morrey, for the American acted as though he had taken Gail under his own special protection.

Of course the bond between the male members of the crew was unbreakable. After so many expeditions together, in all kinds of conditions and in the face of so many perils, could anything come between them? Chris was sure nothing could disrupt their harmony.

He was wrong!

11

More than halfway to the planet – but still more days to pass in relative inactivity! The Patrick twins were sharing their hopes, fears and frustrations by constant contact. At Cape Kennedy the girl with her leg in a cast was painfully aware of the trials of her sister in the far-off space ship. She was reluctant to report her twin's boredom and depression under the conditions of close confinement in the cabin. Instead, for reasons best known to the girls themselves, the patient in the Cape Control tried to cheer her sister herself.

When Sir George Benson or Mr. Gillanders asked how things were going in *Mercury I* they were always told that things were fine – just fine. Benson often looked hard and long at the girl for he had a shrewd suspicion that she was being less than frank.

"Look, Gill," he said to her seriously on one occasion, "we depend entirely on you to report on how things are among our young friends. I know, and we in Control all know, that sometimes things happen in a space ship that, under the peculiar conditions out in space, cause difficulties among the crew. It is vitally important that I be informed of any strain, friction, or even slight differences of opinion that may be taking place in that cabin. And under conditions of the present test, I'm depending on you to report this faithfully."

"There's nothing much," Gill said hesitantly. "Gail says that Tony seems to resent her, but it isn't important."

"That's just where you're wrong," Benson answered. "Even the smallest sign of friction is important. We were hoping to get from you far more information about this than we could hope for from radio messages. We believed that telepathy would be far more revealing about the mental states of the crew than reports by radio would be."

"I'll tell Gail what you say," the girl promised.

"Do, please," Sir George said, "and will you tell her this: She must tell us frankly what she sees and feels without letting loyalty to the rest of the crew stop her. Indeed, she'll be doing them, and crews who may follow in the future, a great service by helping us to study them under conditions which we cannot quite duplicate on Earth."

"Wake up, Gail. Come and have a peep at Mercury."

Morrey shook the girl gently from her short sleep, for their objective was now visible in the lens of the space ship's telescope. The American wanted to show her how this arid little world looked now that they were getting so much nearer. She went over to the telescope and peered through the eyepiece.

"My, it's like a half moon!" she exclaimed.

"Yes," Morrey told her, "that's because we're approaching it on a path almost at right angles to a line joining the planet and the Sun."

"Can you see those marks on the surface?" asked Serge who had now joined them. "They are mountains – or, rather, hills, for there are no towering heights on Mercury."

"That's just what I was about to tell her," Morrey observed with a slight frown. "But if you'd rather show Gail the planet yourself –"

"No, no," Serge said hastily, "I'm sure you can do the job better than I can."

He left the pair and joined Tony, who was watching silently.

"Come with me on a tour of the fuel tanks," the mechanic invited. The Russian shrugged his shoulders and followed.

"It doesn't seem the same having Gail with us," Tony said dolefully as he and Serge squeezed through the narrow spaces between the fuel tanks. The mechanic's eyes were scanning very inch of the surface of these huge tanks seeking for any sign of damage from meteor penetration. Every valve and pipe joint had to be examined for evidence of seepage. This regular duty was Tony's alone, but Serge was glad to join him for he, too, was becoming uncomfortable at the girl's presence.

"Yes, it's a bit strange," admitted the Russian. "We must make the best of it. She's a likable girl but she does seem to have divided us up."

"Morrey sickens me," Tony grumbled. "He seems to prefer Gail's company to ours."

"Cheer up," Serge admonished him. "It isn't too bad – yet."

But the invisible radiation from the Sun, the countless high-energy particles that shot through the ship, were gradually having an effect. Though they could not feel them some of the particles were passing through the radiation shield and into the bodies of the crew. Occasionally a particle would destroy a cell in the brain of one of the five. The effect was a very gradual change in the personalities of Chris and his companions. This was the cause of the growing irritation between Tony and Morrey, though they were not aware of it.

When Serge and Tony returned to the cabin, Gail was still peering through the ship's telescope with Morrey in close attendance. When he gave his report to Chris, the leader could see the annoyance on Tony's face. He decided he must do something before the atmosphere in the cabin became any worse.

"What's biting you, Tony?" he asked in a low voice so that no one else could hear. "Come on, I know there's something wrong."

The mechanic flushed uncomfortably. Like his leader he was fully aware of the critical importance of complete harmony among the crew of a space ship. But it was Morrey that was at fault, continually dancing attendance on that girl. Tony tried to explain this to Chris.

"Stop your nonsense," Chris said sharply. "I won't allow friction between members of my crew. At the same time I'll have a word with Morrey, for he does seem to be going a bit too far. Now get back to your job."

Sometime later Chris was able to call Morrey aside.

"You're spending too much time with Gail," he said, coming straight to the point. "Remember, as far as this trip is concerned, she's just another member of the crew."

"I like that!" the American exploded. "I suppose Tony's been saying something. Are you accusing me of neglecting my job?"

"Don't be an ass, Morrey," Chris replied, keeping his voice low. "You know I'm not, but I'm afraid we're all getting a bit tense. Gail is a new factor among us, and I don't want her to cause trouble."

How could Chris know that it wasn't the girl at all but the unsuspected solar radiation that was causing ill feeling in the space ship. He, himself, was not immune to its baleful effect.

"As long as I do my job well I don't see that it is anyone's business what I do in my spare time," Morrey replied angrily.

"Calm down, Morrey," Chris snapped. "I'm only trying to erase any ill feeling there may be among my crew."

The American looked for a moment as if he were going to give his leader a heated answer, but then he turned and walked away. As he went, Serge and Tony exchanged glances. In the small cabin the exchange between Morrey and Chris hadn't gone unnoticed.

"Everyone but Morrey seems to dislike me," the girl in the space ship told her sister back on Earth. She described the tense little scene between her friend and the leader a few moments before.

"I'm sure it was because Morrey was being decent to me," Gill went on, "though why any of them should resent it, I don't know. I feel there's something very unfriendly in the atmosphere of this cabin."

Naturally Gill was very concerned. She was distressed that Chris, Tony, and Serge seemed to have cooled off toward her sister. On Earth they'd all been such good pals that it was hard to believe this pleasant friendship had evaporated. Urgently she pressed her twin for details, but Gail couldn't really say what was the cause.

Should she tell Sir George or Mr. Gillanders? Gill wondered what she should do. She remembered the Director's strict instructions. Perhaps, after all, it was best to be frank, for Sir George seemed to be expecting something of the kind. But one thing both girls hated was telling tales. If she reported what Gail had told her to one of the scientists, she wouldn't be guilty of tattling would she? However, after a lot of thought the girl in Control decided to tell. She asked one of the staff, who was in her room, to fetch the Director or his deputy.

Both Sir George and Mr. Gillanders hurried to the small ward where Gill was. That she had sent for them was proof to the two men that the girl had something important to communicate. An ordinary message would have been recorded and passed to them in the usual way. This request for their attendance could only mean that she had received an extraordinary message, or something very confidential. As they entered her room, the two scientists could see that the girl was deeply troubled.

"Sir George! Mr. Gillanders!" Gill burst out. "I'm sure there's something wrong in *Mercury I*. Gail's worried. She says even Chris seems to be involved."

"Take it easy, Gill," Benson urged, sitting beside the worried girl. "Tell us everything. Don't hesitate even if it seems trivial. You know what I told you."

"Well, as you know, Tony hasn't been very nice to Gail for the last two days. He dropped one or two cracks about having a girl with them. Morrey's been very decent to her, though, and she thinks this has made Tony worse. It may even have upset Serge, for he hasn't spoken very much to her," the girl said.

"What about Chris?"

"Gail says she's seen him talking to Tony and Morrey, and he didn't seem very pleased. She thinks he was reprimanding them."

Benson and his deputy looked at each other with concern. This was serious. Never before had there been trouble between members of this very experienced crew. Always they had worked cheerfully together, even under conditions of the greatest strain and danger. If there was a clash among the quartet it could be disastrous to the whole expedition.

"Do you think we ought to revert to radio?" Billy Gillanders asked. "To hear our actual voices may help to steady the crew."

"As a last resort, yes," Benson answered, "but we'll try other means first. Tell me, Gill. Have you formed any impression of how this friction has built up?"

"Not really," the girl replied thoughtfully. "Gail seems to be getting impatient with all of them. Only little things, of course, but I suppose they can fray the nerves of anyone cooped up in a space ship."

"That shouldn't happen," Mr. Gillanders told her. "It's never upset Chris and the others before. And Gail has been well trained, too."

"Oh, er – yes," the girl with the bad leg agreed hurriedly. The scientists could understand her wanting to protect her sister.

"Gill, tell your sister that I want all members of the crew to take a firm grip on themselves and to resist any further quarrels. Tell Chris he's to be extremely vigilant. He can break radio silence if he thinks it's necessary," the Director said.

"He won't think Gail and I are being sneaky?" the girl faltered.

"Of course not," Benson almost snapped. "He knows as well as I do the importance of physical and psychological monitoring."

Gail had seen all she wanted to see through the telescope. For some unaccountable reason she suddenly became bored with looking at Mercury and the other planets. She even felt a little impatient with the friendly American who seemed to want to cram her with facts and figures. Maybe this was just to demonstrate the extent of his own knowledge, she thought. Anyway, she'd had enough. Now here was that precious sister of hers telling her that the mighty Sir George Benson ordered them to take a grip on themselves. Oh, well, she'd tell Chris, but the Director didn't know how boring it could be in a space cabin, did he?

Chris was deeply concerned when the message was passed on to him. It seemed to crystallize all his fears. So Gail had reported signs of strain in his crew, had she? What did she know about it? Of course he knew how important discipline was. He was an experienced Captain, and he could handle his crew without advice from poor old Uncle George or anyone else. Still — he would watch them all even more closely from now on.

Morrey had been irritated when, for no apparent reason, Gail had suddenly grown tired of exploring the heavens under his guidance. Perhaps, after all, he couldn't expect a girl to be really interested in big, important things. Girls had a much narrower outlook on life than men, hadn't they?

Perhaps Serge was the one least affected by the radiation — at least he seemed quite calm. But then the Russian had always been the most reserved of the crew, and the others never quite knew what he was thinking. Maybe he was repressing any irritation he felt. He wouldn't explode suddenly, would he?

Chris decided on a bold stroke. He asked all the men to leave their jobs. They and Gail were to relax on their couches while he spoke to them.

"It's quite obvious that we're all getting on each other's nerves," he began, trying to be jocular. "We all know it just won't do. We're supposed to be one team of five, not five teams of one. Now let's clear the air. I suggest we all say, openly, what's biting each one of us. Then perhaps we can get whatever it is out of our systems. Who'll start?"

A stony silence greeted the leader. Things had gone farther than he had thought. If only he could get them talking and discussing their differences then there was a chance they could iron things out.

Chris's idea would have worked if the irritation among the five had been natural. Chris could not know that it was the insidious bombardment from the Sun which was causing these strange reactions, and that no amount of discussion, cajoling, or threats could halt the deterioration of fellowship among the crew.

Sir George Benson and Mr. Gillanders were urgently consulting their colleagues. It was plain that the shielding of the space ship was insufficient protection for those inside. Never before had a manned vehicle approached so close to the Sun. Automatic probes were incapable of revealing the subtle effect of the radiation. Not until a human brain had been subject to the bombardment could the effects be assessed. Now the results were becoming plain. Damage was being done to the brains and bodies of the five explorers.

"Can't we do anything to help?" Billy Gillanders asked in mental anguish.

Benson was thoughtful.

"There's only one thing I can think of," he said at last. "I wonder if it would work!"

12

The atmosphere in the cabin of the *Mercury I* was electric. Chris Godfrey, as leader of the expedition, had decided to take a great risk. He must get his companions talking. The risk was that they would either talk the irritation out of their systems – or they would quarrel openly. None of the others seemed to want to start, so he decided to take the lead himself.

"All right," he said, "As you've all been struck dumb I'll take the plunge. I think you're all being very childish, and I'm pretty much fed up with all of you. You all know what's at stake and yet you're silly enough to let your feelings get the better of you. Morrey and Tony, I blame you most. You've been looking at each other like enemies instead of members of the same crew."

"I like that!" Tony burst out hotly. "Why pick on me?

We've been all right on other trips before we had Gail. Now Morrey's mooning around her all the time. Why did we have to bring a girl, anyhow?"

The American's face flushed and he made a movement toward the mechanic. A glance from his leader made him sink back again on his couch.

"I've never heard such rot," Chris declared. "Gail is with us because Sir George and the other members of UNEXA decided to make this telepathy experiment. I would have thought you'd all be friendly with her. You were back on Earth."

"Things are a bit different on a trip, aren't they?" Tony said doggedly. "Besides, Gail doesn't seem to be standing the strain. Look how she passed out at blast-off. She'd even forgotten about drinking from a tube in free-fall."

The girl's face flushed and then went pale, but she didn't speak. This time Morrey did turn angrily toward Tony.

"Mind what you're saying," he snapped. "Many a man has passed out besides Gail. I think she's stood up to things pretty well. As for forgetting about the squeeze tubes, I could give a list of things you've forgotten. And the first is your manners."

By now Chris could see that his idea had failed. If allowed to go on this discussion might deteriorate into a brawl. He was sick of the whole undertaking and would be heartily glad when it was over. If only he could talk to Uncle George over the radio! He wondered what Gail was reporting to her sister, and here a great disadvantage of telepathy struck him for the first time. He had no control over the messages the girl might send. She might, for example, be sending a highly emotional account of the argument they'd just been having. He had no way of knowing.

However, Chris wasn't far off the mark. In the control room at Cape Kennedy Gill was visibly upset. As her sister's outpourings reached her she could almost have wept with anxiety.

"What is it, Gill?" Mr. Gillanders asked urgently.

"That does it!" snapped Sir George Benson when he was told. "Switch over to radio. Warn them that from now on we shall revert to this means of communication. I'll be sending a message to each of the crew in turn."

The Director paced up and down the room like a caged tiger. He'd never had this trouble with any crew before, let alone his most experienced one. It was this wretched radiation from the Sun. It *must* be. His mind turned to the plan he had worked out to meet the situation.

"The shielding of *Mercury I* has failed," he told a little gathering of his senior men. "We could not have foreseen the unfortunate effect on the crew, and I'm very worried about them. Doctor, is the effect likely to be permanent?"

One of the scientists replied.

"Not as yet," he said, "but if the crew is subjected to much more radiation, the effect will be permanent. You see, the brain is made up of vast numbers of cells, only a small number of which we use. When a small part of the brain or any of the cells in it are injured, other parts gradually take over the functions of the injured ones. When a person has a cerebral thrombosis or a physical accident, he may lose the use of one side of his body, and perhaps his speech. Gradually, in most cases, these functions will return as the brain adjusts to the use of other cells. Unfortunately, the new situation is never quite as good as the old one."

"Some permanent effect does result, then?" Benson asked.

"It depends on the extent of the damage," the doctor replied. "Obviously, if the damage is slight, the eventual result may hardly be noticeable. But if it is fairly serious, the recovery time is longer and the residual effect is greater."

"What about the *Mercury* crew?"

"It is my guess that if the crew could be removed from the radiation zone at once, no great harm will have been done," the medical man declared. "But if they continue to receive the present dose for a few more hours, then the consequences will be serious."

"As they draw nearer the planet they will also be nearer the Sun," Billy Gillanders pointed out. "That means the dose will be increasing."

"That's true," Benson conceded, "so what I propose seems to be the only solution."

The little circle of scientists, extremely worried about the fate of the astronauts, waited for the Director to speak. The Chief's face was serious.

"This is how I see it," Benson began. "The deterioration in the relationships of the crew is unexpected. It has never happened before, for as you know great care is taken in the selection of astronauts and the conditioning they receive. Why there should be tension between Chris Godfrey and his companions can only be explained by the presence of the girl – or this confounded radiation. I think we are all agreed that it is the radiation which is to blame. The shielding we provided is proving inadequate. The radiation is more than we anticipated."

Mr. Gillanders and the others waited. All that Sir George had said was common knowledge. What they were waiting to hear was how their leader proposed to deal with it, for hadn't he said that he had a solution?

"Well, we cannot increase the thickness of the ship's protection, but I believe we can shield it effectively from the solar particles," the great scientist said thoughtfully.

Protect *Mercury I* from that fierce radiation? How could the Director do that when the ship was millions of miles away in space?

"Yes – shield the ship from this dreadful radiation," Benson repeated. "And there's only one thing that can do it. The planet itself!"

The scientists were startled. Use Mercury as a shield from the Sun? Why, of course! But that would mean a complete change of plans. The flight path of the space ship would have to be altered drastically. Could it be done? Could *Mercury I* navigate into the planet's shadow, and could it complete the mission with this protection? Benson smiled a little as he saw the effect of his suggestion on his colleagues.

"Sorry I've startled you all," he apologized, "but let us see if it can be done."

The job was tremendous. Without the help of the giant computer it would have taken months – perhaps years – of work to calculate whether the space ship could get into the planet's shadow. Direction and velocity of the ship and of Mercury in relation to each other was only the beginning of the vast amount of data fed into the machine. The relative size of the Sun and the planet, the length of the shadow cone, the thrust of the ion and chemical motors were other factors in this complicated calculation. At last all the punched cards were inserted into their proper places and the computer clicked and winked its lights as it worked on the gargantuan task.

Actually the time taken to do the job was extremely short, about two and a half minutes in fact. But to Sir George Benson and the watching scientists the delay seemed endless. If the machine decided the project was impossible, what was there left to do? The immediate recall of the expedition, of course. But would the crew respond?

To reverse the direction of the flight would take some time during which the crew would be getting a constantly increasing dose of radiation. By the time *Mercury I* had turned tail, the astronauts may have had a fatal amount. No wonder the little group of men watched anxiously while the machine worked its miracle.

At last the job was done. A card, punched with many holes, appeared in the reply slot. Benson took it out and looked at it, but the pattern of the holes conveyed nothing to him. Quickly he inserted the card into the reading machine which would scan the card and transcribe its message into typewritten form. As the printed answer began to emerge, Benson and the others crowded around.

"It's possible," the Director shouted even before the machine had finished its work. There was a relieved cheer from the scientists as they eagerly bent over the sheet Sir George was now holding.

"Yes, it's possible, but only just," Benson said soberly.

He and the others could see from the slip of paper that *Mercury I* would have to execute a very difficult maneuver. The long sweeping flight path the ship would have to follow, so that it could hide behind the fast-moving planet, was very different from the planned trajectory. It would have to be turned once more so that its velocity could be boosted. Even then some days would be added on to the length of the journey.

"What about the return flight?" Mr. Gillanders asked.

"That's what is worrying me," Sir George confessed. "Because of the small size of Mercury, it can throw a shadow for only seven million miles. The ship can keep in the shade for this distance, but then it will be exposed to the full solar radiation. And that might prove fatal."

"Wouldn't it be better to recall the expedition now?" one of the scientists asked. "At least it would give the crew a slim chance."

"A very slim one, I'm afraid," Benson sighed. "Still – I would take it but for one thing. Look at this."

He pulled from his pocket a folded sheet of paper and passed it to his Deputy. Mr. Gillanders could see it was a memo from the famous Mount Palomar Observatory. He read it quickly and then passed it around.

"So the solar chaps at Palomar predict a period of inactivity in four to five days!" Billy said thoughtfully.

"That's what the memo says," Benson agreed. "Of course they can't be quite sure and even one small sun-spot would be enough to cause trouble."

The little group around the Director could appreciate the difficulties of the situation. Though sunspot activity could be foretold with reasonable accuracy, it wasn't always completely accurate. For some unknown reason the Sun still managed to defeat the forecasters occasionally just as the weather did. Was the prediction sufficient justification for risking five lives?

Sunspots, as all the men knew, are those vast disturbances which suddenly appear on the solar disc and which are responsible for shooting vast quantities of radiation out into space. For generations it had been known that, generally speaking, sunspot activity follows an eleven-year cycle. That is why space exploration is mainly concentrated during the quietest period of the cycle. Only deep space probes, well away from the Sun, are mounted during periods of great activity.

The expedition to Mercury had been planned for a reasonably quiet period. It was the unpredictable intensity of solar radiation within the orbit of Venus that was causing the trouble. The immediate concern was to get the astronauts home safely. If *Mercury I* could take shelter in the shadow of the planet; if, when there, it could coast along for a time; if the prediction of the solar astronomers was correct, then the space ship might just escape the worst effects of the solar bombardment.

Sir George passed his fingers through his white hair. He was deeply worried.

"We'll try it," he announced quietly.

The problem now was to get into touch with *Mercury I* and to pass on to Chris his new instructions. From now on they must use the radio. Chris must be told to switch over from telepathy. Gill must get through to her sister to tell him to do so.

"You all know what to do," the Director said. "Back to your posts, fellows. I'll communicate with the ship."

Benson wondered what the next few hours would mean. Would this difficult operation succeed? Or would the radiation already have done its worst? Would Chris and his crew still be capable of steering the ship through the complicated program?

"Can't get through on the radio," one of the men in Control reported as Benson strode in.

"Must get Gill to get through somehow," he muttered, as he watched the radio operator vainly trying to contact the ship. "Let's hope Gail hasn't been affected too much to communicate."

When he went to the Patrick girl Sir George found her in tears.

"I – I can't understand it," Gill wailed as Benson approached. "She doesn't respond."

"What do you mean? What's happened?" Benson demanded.

"It's Gail. I knew she was upset, but I've never lost contact with her before. She isn't dead, is she?" the girl asked fearfully.

"Of course not," Sir George replied with more assurance than he felt. "I expect it's because of the trouble caused by this wretched radiation. You must keep trying to get through, Gill. We can't get them on the radio."

"What shall I tell them?" the girl asked with a barely stifled sob.

"Drum it into them that they must switch over to radio," Benson told her. "That's most important. Then try and make them understand that the tension they feel is due to radiation and is not their fault. They must be tolerant with each other until we've moved the ship out of the Sun's rays. After that you can let them know we're going to change the ship's course pretty drastically."

"I'll try," the girl promised doubtfully, and she leaned back in her chair and closed her eyes. With all her power she concentrated on sending her thoughts to her sister, for she knew that Gail's life and those of her four companions depended on it. Perspiration broke out on Gill's face and a little pulse could be seen beating in her temple.

"It's no use!" she burst out at last, "I can't do it. Gail doesn't answer."

13

A gloomy silence reigned in the cabin of the space ship *Mercury I.* The four young men and the girl felt restless and ill-tempered. What had gone wrong? Chris wondered as he looked around at his gloomy companions. Only the power of his own personality had prevented an open breach among his friends. At any moment trouble might flare up again, and he doubted his ability – or desire – to suppress it. If his own feeling of irritation was anything to go by, the others must be quite disturbed.

The girl was in the worst state of all. She was twisting her hands nervously as she lay on her contour couch. Her face was pale and drawn, her mind in a turmoil. Why did she have to be here at all? It was this wretched telepathy that had brought her to this awful situation. For the first time in her life she hated the gift she shared with her sister. Indeed, just now she felt she hated everyone and everything.

Even her sister? The girl turned on her couch restlessly. She didn't know. All she was certain of was that she didn't want any more mental messages, and she wished she were back on Earth. But it was one thing not to want telepathy and another to shut it out. Her sister's thoughts were constantly hammering in her brain. Try as she would, she couldn't shut them out. Well, she could ignore them and refuse to answer.

Serge wandered over to the telescope. All pleasure or excitement in the expedition had vanished. He'd never disliked a mission before. When they got back he would seriously consider giving up astronautics altogether. After all, he'd had a good run, hadn't he? Meanwhile they had a date with Mercury.

What was the planet looking like now? Serge could see the crescent was much larger than when he last looked at it. The faint markings were becoming plainer even against the dazzling background of the sunlit surface. Surely they wouldn't make a landing on that little world of great extremes.

Morrey and Tony were glaring at each other, each wondering how he'd ever liked the other. Morrey was thinking the mechanic was a pain in the neck. Tony thought the American arrogant.

Suddenly there was a cry from the girl on the couch.

"Get away! Leave me alone!" She was sobbing hysterically. The crew looked at her in surprise. For a moment Chris wondered if she was having hallucinations. Then he guessed she was speaking to her sister. He made his way over to her.

"What's the matter, Gail?" he asked, gripping the girl's shoulders firmly and giving her a gentle shake. "Pull yourself together. Is there a message for us?"

Gail looked blankly for a moment at the leader.

"I – I don't know," she mumbled, "I'm all confused."

"Is it Gill? What does she say?" Chris demanded urgently.

"Please! Let me alone," the girl gasped, trying to shake off Chris's grip. Then she began to weep.

The four astronauts looked at each other uncomfortably. Imagine someone in a space ship crying! Tony turned away in disgust, but Chris persisted in his efforts to get some sense out of the girl.

"Come on, Gail," he said, "you must tell me what's in your mind."

His voice was low and compelling. With what seemed a great effort the girl tried to calm herself.

"It's – it's radiation, Gill says, that's upsetting us all. We – we must be patient. Must switch to radio."

Thank goodness, Chris thought to himself. If we can use the radio I'll find out what she means about radiation. Aloud, he spoke warmly to the girl and told her to relax and not worry.

The others had heard what Gail had said and Tony was already at work on the radio.

"At least it won't start weeping," he muttered to Serge, who had gone along to assist.

It was a great event when the sound of another human voice was heard in the cabin. Not till that moment had the crew realized how much they had missed their usual contact with Earth.

"Control calling *Mercury I*, Control calling *Mercury I*. . . ." the voice kept repeating.

If that distant radio man had told them they had each been left a fortune, the crew could not have been more thrilled.

"*Mercury I* calling Control. We are standing by to receive you," Chris called into the microphone.

Some little time would elapse before they could get a reply, so Chris turned to Gail.

"Feel better now? Let them know we're receiving them and that our acknowledgment is on its way."

"Chris, Gill keeps trying to tell me that its some kind of radiation from the Sun that is causing us all to be upset with each other. She says Sir George Benson wants us to be patient with each other and says none of us is to blame."

All the crew heard Gail's words and they all felt stunned by what she'd said. Never for a moment had they thought that some outside agency was causing this mutual irritation that they felt. It was as if a great sigh of relief went up in the cabin of the space ship. Though this radiation was obviously harmful, they much preferred it as the cause of the recent flare-up than a natural dissolution of old ties.

Messages from her sister were now coming more easily. The girl, too, was feeling much happier now that she knew she was not the cause of the trouble among her friends.

"We've got to change course," she announced just as the voice of Sir George Benson sounded from the loudspeaker.

"Hello, crew of *Mercury I,*" the Director said, his concern for them coming through. "You've been told that you're getting a stiff dose of radiation. There's only one thing we can do about it. You've got to navigate the ship into the planet's shadow."

The crew's feelings were very mixed. They were still puzzled about the curious effect of the invisible bombardment; they were astounded at the decision to shelter behind the planet; they were worried about the complete change this would mean to their flight plans.

"Hello, Uncle George," Chris called. "Are we glad to hear your voice! Telepathy may be quicker, but we missed the little chats. If Mercury will hide us from these wretched rays, let's get behind it at once."

"We've been told that in a few days there will be a particularly quiet period on the Sun," Benson's voice went on, for of course Chris's reply hadn't yet reached him. "It will be safe for you to make the return journey then. Meanwhile, get ready to move your ship pretty sharply."

"Will do," Chris called back. "Let us have the program as soon as you like."

Perhaps it was the knowledge that they were not responsible for their recent behavior that made the four astronauts and the girl feel better. The immediate feeling of anger and irritation had largely subsided, but it hadn't disappeared entirely. If they continued in sunlight the ill feeling would probably return, and even more severely than before.

"Hello, Chris," Sir George's voice boomed. "It seems we'll have to use both telepathy and radio in the future. Stand by for orders. They're rather complicated, I'm afraid."

The Director's last words were an understatement. Never had Chris and his crew had such a long string of instructions. And they were urgent, too. They involved turning the ship again, cutting off the ion motor, switching on the chemical rocket, turning the ship as sharply as possible through 80 degrees, and then bombarding Control with a string of observations so that their path could be computed accurately.

"Wow!" breathed Morrey, secretly glad that they now had plenty to do. "What a maneuver! Who worked this one out?"

"Come on, we'd better get moving," Chris called sharply.

The crew went about their tasks with the old efficiency.

"The computer I suppose," Serge said calmly.

For the time being at least, there was no sign of the friction that had plagued them recently. They needed all their concentration to carry out the instructions that were pouring from the radio. Never before had they carried out such a complicated operation, and from what Sir George Benson had told them, there was little room for error.

First, the ship which was of course traveling tail first in the long process of deceleration, had to have the ion motor shut off. Then it had to be turned through an angle of 105 degrees precisely. Next, the chemical motor had to be ignited to send them on their new course as quickly as possible. Because of the limited supply of chemical fuel and oxident, the motor could only run for 135 seconds. After this period the ion motor would again take over and the ship would travel along a great arc that would eventually bring it within the planet's shadow cone.

For several hours Chris and the other three astronauts were completely absorbed in their difficult task. They hadn't time to think of rest, food, or anything else. The presence of a girl among them was forgotten completely. Gail lay miserably on her couch, strapped in against the strains and stresses of the change of direction and velocity. Not until the first phase of their task was complete did the crew give a thought to the unhappy girl.

"Now for a breather," Chris sighed as he sank on to his couch. "Sorry we've neglected you a bit, Gail."

Then he noticed the girl's pale, unhappy face.

"Hey! What's the matter?" he asked in some alarm. "Do you feel all right, Gail?"

The girl looked at him silently and he could see tears were not far away.

"I've let you down," she said in a voice that shook. "I've failed the test."

"Nonsense," Chris declared. "You did very well. It wasn't until this radiation began upsetting us all that we had to switch back to radio."

"And you've proved telepathy is much the quicker," added Morrey, who had joined them. "It's reliable, too."

Serge and Tony had come over as well.

"I doubt whether radio would have conveyed to Sir George that there was something wrong," the Russian said. "A human mind is much more sensitive. If Control had had to find out by radio, it might have been too late."

"Yes, you must have given Gill a clue quite early," Tony said. "We should probably have been too stubborn or too blind to see and tell Control what was happening to us."

"You – you really think I've helped?" the girl asked, looking at her four companions.

"Of course," they assured her in a chorus. "You probably saved us from something rather dreadful."

Though the girl was obviously delighted to have these firm assurances, Chris could see she was still troubled, though he didn't say anything to the others. Later, when the rest were making a further adjustment to the ship's course, he spoke to her about his suspicions.

"I can see there is still something troubling you, Gail," he said. "Just tell me what it is."

The girl seemed startled at the question. For a moment Chris thought she was going to confide in him. Then she forced a brave little smile and assured him firmly that there was nothing wrong. Chris didn't believe her, but said nothing. He was sure Gail was under some strain other than that caused by the solar bombardment. He decided to keep an eye on her.

"Sir George wants to know the precise time that Mercury occults the Sun – whatever that is," Gail said a little later.

The crew was glad that Control was still giving the girl something to do, for they themselves could do very little about this. She couldn't help, of course, with the navigation, and the radio was back in use as the main means of communication. Still — here was an example of how instant telepathy could supersede the slower radio.

"To occult means to cover up," Serge explained to the puzzled girl. "What Sir George wants to know is the exact moment that the planet blots out the Sun. That will be when it's directly between us and the Sun. In other words, when we enter the shadow."

Morrey had been on duty at the telescope. He was peering through the special eyepiece that permitted direct observation of the Sun. First he'd seen the crescent of Mercury get smaller and smaller as the ship sped behind it. Then at last it had completely disappeared as the planet neared a line between the space ship and the Sun. Soon he could see a piece out of the solar disc as Mercury began the eclipse. It was just like an eclipse of the Sun by the Moon, he thought as he watched intently.

Chris, too, was standing by for the signal from Morrey. As *Mercury I* entered the shadow he had to make one final alteration to its course. A short blast on one of the lateral rockets would point the ship directly at the planet. Then they would be clear of the harmful radiation.

"Get ready," Morrey called out. Chris and Gail waited intently.

"Now!" the American barked suddenly.

At the same instant Chris pressed the firing switch and Gail flashed the message to her sister.

"Good!" Sir George Benson exclaimed as Gill received it in Control. "Now we can work out the next stage." The information had come four minutes earlier than it could have reached them by radio — a vital factor in the calculations that would follow.

To keep within the shelter of Mercury, until the harmful effects of the sunspots had subsided, the space ship would have to follow the planet on its endless journey around the Sun. Always it would have to keep on the dark side of that hot little world, its velocity changing as it drew nearer.

"Thank goodness for the electronic brain," breathed Mr. Gillanders as the giant machine rattled out all the answers. "We could never have done this job before computers were invented.

"That's true," Benson agreed absently. He was studying the flight program that had emerged from the machine. *Mercury I,* it seemed, could not keep within the planet's shadow for a sufficient length of time for the sunspots to clear.

"You know what that means?" the Director asked as he passed the information on to his deputy.

Mr. Gillanders studied the data and then nodded.

"It means," he said, "that the space ship must land on the planet."

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Mercury I had reached safety just in time. In spite of the exacting duties they had to perform, in spite of the need to concentrate on the job, in spite of the knowledge that it was something outside them that had caused the trouble, the crew was beginning to feel irritable again. Chris was aware of this, and he heaved a great sigh of relief when Morrey's shout came. Now, at least, they would escape those malignant rays.

The leader's relief was short-lived. His pleasure in reaching the planet's welcome protection was dissipated when he heard from Control that a landing must be made. No longer was it a matter of choice whether *Mercury I* touched down on the arid little world after which it was named. Now they must make a landing on the dark side of the planet. They must wait in the coldest spot in the solar system for the Sun to quiet down so that they could return safely to Earth.

"Why couldn't we stay in the shadow without landing?" Tony asked, when Chris had explained the situation to his companions.

"Because we're too near the planet to do that," Chris explained. "You see, the Sun is much larger than Mercury, so the planet's shadow is not very long. We're too close to escape its gravity which will pull us down if we just coast along in the shade."

"So we shall not be touching down in the light? We'll not be able to check the surface," Serge pointed out.

"I'm afraid that's so," Chris agreed. "All we can do is avoid any mountain masses which will show up on radar, and for the rest, trust to luck."

"Do you think it will be possible to step outside and explore a bit?" Morrey asked hopefully.

"Depends on the temperature. Remember, our suits haven't been tested to anywhere near absolute zero temperature. The dark side of the planet has possibly no temperature at all," Chris told them.

"Sir George wants to know how we all are," Gail said, interrupting the crew's discussion. It was good to know that even at this distance this strange form of communication would work.

"Tell him we're fine. We're feeling better already," Chris answered. "But what about you, Gail?"

"Oh, I'm all right," the girl answered, a trifle too quickly. Chris looked at her keenly.

At Cape Kennedy the Control Room staff were following intently the flight of *Mercury I.* The crew had done a wonderful job in getting the ship on the right path. Now it was approaching the cold side of the planet and it wouldn't be long before the touchdown took place. A mere half million more miles to go.

"We're getting some interruption of the radio," one of the scientists reported to Mr. Gillanders.

Billy wasn't really surprised. After all, the space ship was a long way off and it might be that some ionized layer surrounded the planet as it did on Earth. It was quite possible that, if it existed, the ionized layer might be of such intensity as to prevent radio propagation. If this happened, then whether they liked it or not, the only means of communication between Control and *Mercury I* would be through the two sisters. The big Australian mused on how ironical it would be if all the wonderful and costly radio apparatus failed and they had to fall back on this strange power of the human mind.

When Sir George Benson returned to duty after a brief spell of rest, Mr. Gillanders told him about the intermittent radio contact. Like his deputy, the Director was of the opinion that the probable cause was strongly ionized layers, similiar to our Van Allen belt, surrounding the planet. Contact between the two girls, he was told, hadn't been affected, though Gill had expressed some concern for her sister. When pressed to be more specific however, the girl had made light of it.

A fresh team of men relieved the weary scientists on duty at Control. Sir George had ordered this changeover, for he wanted his staff to be in top form for the highly critical approach and landing of the space ship. Though the main burden of the task would fall on Chris and his crew, Control must be ready to give instant advice if required. The staff must also record and study the vast flow of information automatically telemetered from *Mercury I*. If disaster came it was essential, for the sake of those who would follow, to know the cause. The spasmodic radio contact was bitterly disappointing, so it was essential for the men on duty to pounce on every scrap of data that came through.

"Hello, Gill. How are you feeling?" Benson asked as the girl was wheeled into the Control Room.

"All right, thank you," she answered with a brave smile, though Sir George noticed that she was a little pale.

At her own request, Gill had been brought right into the nerve center of the whole undertaking. She wanted to watch, and to share the tense period which would mean so much for the safety of her sister and the four astronauts. Benson had been only too happy to agree, for having Gill at his side might save valuable seconds when the crucial moment came.

"Just ask how our signals are coming through," the Director requested, after Gill was settled comfortably in her wheelchair beside his desk.

"Erratically," she answered almost at once. "Gail says they receive you for a few seconds, then everything goes dead for a time. It seems to be 'on and off,' with the 'off' periods getting longer."

"H'm. That's not too good," Sir George said seriously. "I'm afraid we're going to work you rather hard, Gill."

"I don't mind," the girl answered stoutly. "That's what I'm here for, isn't it?"

The ordeal for the twins was about to begin.

"Looks as if it's up to you, Gail," Morrey whispered, as the girl told her companions of Sir George's decision to use telepathy. The girl nodded silently. She wasn't feeling well but she refused to admit it. Now that the most critical time of the whole voyage was upon them, she would die rather than let her friends down.

"Let's begin," Chris said, smiling to give her confidence. He passed her a sheet of paper on which he'd written the first of the vital readings he wanted her to transmit.

"Distance 364,000 miles, velocity 92,100 miles, direction center of objective three and a half degrees, temperature 14 centigrade internal, minus 203 external. Pressure 720."

Silently the girl studied the figures. These were the vital statistics on which their safety depended. An error on her part might well be fatal. She must use all her will-power and concentration to get this information through to her sister accurately. Likewise she must faithfully repeat to her companions all instructions coming from the Cape. She closed her eyes and thought with all her might. A trace of perspiration could be seen on her forehead. It would be much easier if she were feeling fit.

Now came the reply and instructions from Sir George. A close watch was to be kept on the ship's velocity so that the effect of the planet's gravity could be studied. Chris was to give Control his speed every ten minutes. Though they didn't tell Gail, this reminded the crew forcibly of the desperate time when the giant planet Jupiter was drawing them relentlessly to disaster. Mercury was a tiny world compared with the vast Jupiter, and its pull could only be a tiny fraction of that of the giant planet. Nevertheless the crew could appreciate Sir George Benson's caution after the fright of their last voyage.

"Radio's given up altogether," Tony announced. "Tell Control we're not getting them at all, Gail."

The girl promised she would, but with the constant messages she was flashing to Earth and the instructions pouring back, she was exhausted. Chris, seeing her condition, tried to keep the work to a minimum, but the demands from Control were critical and could not be ignored. Temperature, pressure, radiation count, velocity, bearings from different stars, distance from the planet — all these had to be transmitted to Control every ten minutes. The girl felt herself reeling.

"Two hundred and forty thousand miles. Seventy-nine thousand miles."

These were the figures to which Gail paid most attention. As their ship streaked toward the planet its speed was falling. Suppose it was still going too fast when they hit Mercury! Control knew what it was doing, she kept telling herself. Besides, Chris and the others were as calm as icebergs. Everything must be all right.

Yes, everything was all right — if the figures Gill had been calling out were correct. Benson plotted the velocity and distance on the chart he had prepared. They agreed closely with the program worked out by the computer. Mr. Gillanders was bending over his Chief's shoulder.

"Looks pretty good," he observed with satisfaction. "The trickiest moment now will be the changeover to the chemical motor. Hope nothing goes wrong with that."

A red cross marked the point on the chart where the switch must be made. When the line Benson was plotting reached it, he would order the ion motor to be shut off and the chemical rocket to take over. Provided Chris received the message correctly and without delay, the ship should land fairly gently on the unknown surface of the planet.

"How are the girls doing, Billy?" Sir George asked.

"Well, as you know, since the radio conked out, we've been giving them a pretty rough time. Both of them must be tiring, I'm sure. They've never before had to put their gift to such a sustained and exacting test."

"I hope they last," the Director said earnestly, "at least until the switch over. It will be up to the crew after that."

"Gill will be all right but it's Gail I'm concerned about," declared Mr. Gillanders. "She doesn't seem to be standing up to the strain quite as well as her training led us to expect."

The girl in the wheelchair – the leg in a cast sticking out stiffly in front – was the center of activity at the Cape Kennedy Control. Members of the staff had given up looking at their useless instruments and had turned away from the radio. Now they were watching intently this slip of a girl on whom they depended for all their communication with the distant space ship. More than one of these highly skilled men thought it ironic that the finest apparatus man had ever made had failed, and that man himself had to take over the job.

It still seemed fantastic when Gill spoke the words that flashed into her mind. To the watching circle of scientists it was incredible that these should be the words of another girl so many millions of miles away. Almost unconsciously they looked for a radio or some apparatus they could understand. Finding none, they were left to wonder at this miraculous means of communication.

"A hundred and ninety-eight thousand. Sixty thousand."

Gill's words were calm and matter-of-fact. It was as if she were reading aloud the price ticket of a dress or coat instead of repeating information coming to her from the Mercury expedition.

Sir George and his deputy saw that the new position was following the plotted line on their chart. All was going well so far. The ship was decelerating nicely, and the chemical motor should have no difficulty in setting it down in the frozen blackness of the planet's dark side.

"Keep it up, Gail," Morrey said encouragingly. "A few more hours and the worst will be over."

Gail couldn't even raise a smile. She was feeling awful. Her head was swimming and she felt hot and cold alternately. She knew she was going to be ill, but she was trying to fight it off until the ship had landed. Would there never be any rest from these endless messages? It took all her will-power to understand and transmit the figures that Chris kept giving her.

Chris was becoming more and more concerned about the girl's condition. He could see she was on the point of a breakdown. Tablets from the medical kit had failed to relieve her headache. Only a complete rest would help her. And that he couldn't allow. Like the men in Control, Chris knew how critical the situation was. Any variation in the planned distance and velocity would affect the time the chemical rocket motor must be switched on. If Gail failed to get her messages through, the whole operation would become guesswork – which would increase their danger astronomically.

"A hundred and ten thousand. Forty-seven thousand."

Together with the other information the girl forced herself to transmit these latest figures. She could see how anxiously the rest of the crew were looking at her. Chris kept apologizing for working her so hard, but she knew he had no alternative. The lives of all of them were at stake.

"Shut your eyes and relax a little," Chris urged. "We'll cut out the next message."

"No, please, no," Gail implored. She knew that if she did shut her eyes she would sink into a sleep as deep possibly as a coma. Then any further communication would be out of the question. But oh, how she longed to rest! When she was able to relax she knew she would sleep for a week.

Chris was shaking her gently but firmly. Gail stared at him blankly for a moment. Then her pale face flushed with shame. So she must have fallen asleep momentarily in spite of her determination not to.

"Sorry, Gail," Chris was saying kindly. "We've got to get *the latest position through to the Cape. Can you send this?*"

She looked at the figures on the paper in astonishment. They were within thirty thousand miles of the planet, and their velocity had fallen to twenty-one thousand miles an hour. She must have been asleep for quite a while. But she must see that it didn't happen again. By concentrating with all her strength she got the message through to the great relief of her sister on Earth.

"We wondered what had happened to you," Gill's thoughts were saying. "Now stand by for the changeover. It won't be long."

That was the last the girl remembered. Her head sank forward, her eyes closed, and she seemed unconscious — just when the vital instructions would be coming through. Chris and his companions looked at the sleeping girl in horror.

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"Gosh! What shall we do?" asked Tony.

Chris didn't reply. He was busy slapping the girl's face. It was, he felt, an awful thing to do, but he must rouse her at all costs. At last the sleeping girl moaned.

"Gail! Wake up! It's vitally urgent. Try hard, Gail. Speak!"

The leader persisted with his talking and slapping, and at last the girl's eyes opened. With his face barely a few inches away, Chris looked intently into her eyes.

"You must keep awake," he said, emphasizing each word. "If you don't the expedition will fail. We're waiting for the signal to start the chemical motor."

He could see that Gail understood, and he admired the tremendous fight she was making to stay awake.

"All right," she managed to gasp.

"Tell Control we're waiting for the signal," Chris requested, and they could see the girl's effort to concentrate.

"In — about half an hour," she gasped out the reply.

So she had to be kept awake for another thirty minutes. It was going to be a tremendous task, Chris thought in despair. However, he managed to get Gail to send another position check which Control acknowledged. Then the crew took turns talking to her and slapping her face if she closed her eyes. Would she be capable of receiving the vital message? Chris kept asking himself. Suddenly Gail seemed to become more awake.

"Stand by," she said in a stronger voice.

Immediately the crew went to their posts ready to shut off the ion motor. Then they must scurry to their contour couches ready for the tremendous kick the chemical motor would give. They had precisely twelve seconds in which to make the dash and to fasten themselves down. Morrey saw to it that Gail was secured already.

The seconds ticked by with painful slowness. Tony began to wonder if the girl would pick up the signal at all. Perhaps even now they'd passed the critical point and were doomed to crash on to the planet. At the speed they were traveling — more than seven miles a second — a few moments delay could be fatal. Why — oh, why did they have to depend on this girl?

"Switch over — *now.*"

Gail's voice was hoarse but clear enough for the message to be understood. In a split second the crew had swung into action. Very soon the gentle thrust of the ion motor died away and they floated about in free fall. But they were too preoccupied now to perform their usual gambols in this strange condition. Various adjustments had to be made to moving pieces of apparatus in the few seconds they had available. Then, one after another, they propelled themselves over to their couches and feverishly fastened the straps.

Chris pressed the firing button which was on a small auxiliary panel just above his head. For a split second nothing happened. Then came the terrific kick they'd been expecting. As the giant motor roared into life, a fierce pressure forced the crew right down into their couches. After two minutes the motor would shut off automatically and they would then be able to check their position.

Just two minutes after it fired the chemical motor died down. Its terrific thrust – against the direction of flight – had slowed down the ship's velocity considerably. Now, just as quickly as they'd hurried to their couches, the crew left them to find out how fast they were moving and how far they were from the planet.

"Distance two thousand miles, velocity nineteen hundred," said Chris. "Sounds pretty good. Let's see what Control has to say."

They turned toward the girl, their only means of communication. As soon as they did they all realized that Gail hadn't spoken since the chemical rocket was fired. No one had heard a sound from her. They had all been too busy to give her a thought – until now.

"She's unconscious," exclaimed Serge, who reached the girl's couch first.

The others bent over. Gail's eyes were closed and she was very pale. Chris took her wrist to feel her pulse. Then he bent down to see if he could hear her breathing. The others watched in growing alarm.

"She's all right, isn't she?" asked Tony. "She isn't dead?"

"No," Chris said at last. "She isn't dead. But she may soon be. Her respiration and pulse are almost nonexistent."

"What can we do? We can't let her die," declared Morrey anxiously.

"We shall all die if we don't maneuver this ship," Serge pointed out.

What a dilemma! If they turned their attention to setting the ship safely down on Mercury the girl would die. If they devoted themselves to trying to help her, the ship would crash on the frozen surface of the planet. One life – or five?

"Morrey, you and Tony give her oxygen and injections," Chris snapped. "Serge and I will try and make the landing."

While the American and the mechanic worked feverishly on the unconscious girl, Chris and Serge tackled the tremendous task of landing the space ship.

"Nine hundred miles."

The Russian called out the ship's distance from the planet at regular intervals. Their telescope was completely useless in the absence of any light. Only the radar was a help. As yet it gave no indication of the nature of the surface but just the average distance away.

Chris was watching the ship's velocity carefully. He knew it would gradually build up again under the pull of Mercury's gravity. Once more he'd have to fire the chemical motor to kill all their speed. And this time zero velocity would have to coincide with zero distance. How he wished he had the help of the computer at the Cape.

For a moment Chris glanced across at Morrey and Tony. They were still working on the girl, who showed no signs of recovery. What a help it would have been to get just one more message through!

"Six hundred and fifty," the calm voice of Serge informed him.

Chris noted the ship's speed and then did some rapid calculations. In ninety seconds he must give the chemical motor its final burst. Seventy seconds after that, if all went well and his calculations were correct, they would feel a bump. It would be the touchdown.

"Watch out!" he called to the others, and they all scrambled back to the couches.

Carefully watching the second hand of the chronometer, the leader had his fingers poised on the vital switch. Just at the precise second he pressed it, praying silently. On his action depended the lives of his friends.

The familiar kick followed. It was now or never! Suddenly he had a horrible thought. He hadn't switched to the automatic cutout – the arrangement whereby the chemical motor would be shut off at a thousand feet above the surface. Unless he could repair the error they might land on Mercury and then shoot off again into space. With a tremendous effort he managed to overcome the terrific thrust and flicked the necessary switch. All he could do now was to lie back and wait.

If the seconds had passed slowly before, now they seemed to stand still. For one dreadful moment Chris thought the chronometer had stopped. But no, the finger was creeping imperceptibly around. The hearts of the crew were beating fast as they waited for the final moments. In a short time, now, they would either be sitting on that dark freezing world or they would be dead. Perhaps, still unconscious, Gail was the lucky one, knowing nothing about it.

Wham! Thud! The ship jarred sickeningly. It had touched something solid. At the same instant the thrust died away. In a split second Chris wondered why the motor hadn't cut out before actual contact. The only answer was that they must have struck something projecting at least a thousand feet above the average surface. But before he could think any more the ship began to roll over. Then it stopped – and didn't move again.

So they were on Mercury – and still alive! A deep sigh of relief came from the four astronauts, and a faint moan from the girl. Now they must take stock of their position. And they must find out if *Mercury I* had been damaged in landing. This was the number one job, for if the hull had been fractured by the impact, then their oxygen would escape and life would be short. If, however, the ship had survived its ordeal, the next task would be to prepare it for blast-off.

"Are we going outside?" asked Tony.

"Not yet," Chris told him. "Let's check the ship from inside first."

While Morrey continued to do what he could for the still unconscious Gail the other three began a careful examination of the hull. A few pieces of apparatus were awry from the impact, but no serious damage could be seen. The pressure inside the cabin was constant, so it seemed that all was well. An external examination would be necessary, however, to make absolutely sure.

"I think she's coming to," Morrey told his companions with relief.

True enough, the girl seemed to have more color in her face and her breathing was stronger. Quite suddenly she opened her eyes and they saw in them wonder – perhaps fear. In a second she remembered where she was and tried to speak.

"Take it easy, Gail," Chris advised. "Just lie quietly till you feel stronger."

"Drink this," Serge said, fetching something from the medical stores.

She drank it, closed her eyes, and then opened them a little later.

"I'm much better now," Gail said, though her voice was rather weak. "Sorry I passed out."

"That's all right," Chris told her, reassuringly. "When you feel fit enough see if you can contact Gill."

"Where are we?" the girl asked suddenly; "it feels different."

"We've landed on Mercury," Morrey told her. "A rough touchdown, but we seem all right. Gravity, remember, is much less here than on Earth. But at least it's natural gravity."

Gail looked around the cabin and could see evidence of their impact. The walls and floor, too, were at an unusual angle. However, Chris and the others didn't seem worried, so everything must be all right.

"We've landed," Gail flashed to her sister.

"Gosh! What's happened to you?" the girl on Earth demanded. "You've given us a fright. Did you pass out?"

The two girls conversed in their strange manner for a few moments and then Gail told her leader that she was "operational" again.

Chris gave Gail a brief account of their situation to pass on to Control. He said that the hull appeared undamaged by the landing, but that they would have to examine it from outside to make sure. After the routine observations from the cabin they would venture out on to the planet's surface to find out how the ship was standing on the ground. Had Control any special instructions?

Control had. Any excursion from the protection of the ship must be very brief. The intense cold would penetrate their suits if they remained in the open too long. Never for a second must they forget that here they were faced with conditions never before encountered in the solar system.

On behalf of the crew, Chris acknowledged Sir George Benson's warning. He was well aware that, although they had voyaged as far out as the giant planet Jupiter, they had never encountered the intense cold they would meet here on the dark side of Mercury. Moreover, he knew that at temperatures near absolute zero strange things might happen to the metal of his space ship. Even stranger things might happen to electric circuits, for very low temperatures turned some metals into superconductors. At no laboratory on Earth had it been possible to test their equipment in the cold they would now encounter.

"Ask how soon it will be possible to blast off," Chris said to Gail.

The answer came back at once. Sir George was watching the situation and he'd let them know the very minute it was safe for them to leave. The moment the sunspots had died away he'd order their take-off. They must be ready to leave at any time after the next seventy hours.

"Let's test the radio," Chris said, but it was still impossible to get through to Earth as he had feared. Gail still remained their sole means of communication. One thing they did discover that cheered them. It was still possible to talk to one another over the spacesuit radios. That meant that whoever ventured outside the ship would be able to keep in touch with those in the cabin.

Carefully, methodically, the crew went about their tasks while the girl watched from her couch. In spite of the cabin's strange angle the astronauts moved about observing the many instruments and recorders. Tony carried out one of his familiar checks of fuel tanks, supply lines, valves and pumps.

"Whew! Look at this!" Morrey called out.

It was the special thermometer recording the temperature outside. Its reading was precisely nil. Never before had the crew seen one of these instruments recording no temperature at all. It was rather frightening to think that here no heat existed, that the almost mythical state – absolute zero – had been reached. Wherever else man went in his exploration of the universe he would never find a lower temperature than this!

"That seems to be all we can do here for the moment," Chris said at last.

The crew fell silent, for they knew what was coming next. One of them must venture out of the protection and warmth of the cabin to brave the fearsome conditions outside. Which of them would it be? Chris knew each one would willingly take this essential risk. But he didn't intend to let his friends do it.

"Get my suit ready," he said quietly. "I think I'll take a stroll outside."

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Ten minutes later, with the help of his three friends, Chris was suited up. Serge checked the fastening of his leader's helmet; Morrey affixed the full cylinder of oxygen while Tony tested the radio.

"All set?" they heard Chris's voice say from the loudspeaker. "Shall we get started?"

All was ready for the astronaut to venture outside the ship. Soon he would pass through the airlock and then he would clamber down the side of the rocket to stand on the planet Mercury. He would be the first human being to set foot on a world of unbelievable cold and heat. He would be standing in zero temperature and in utter darkness. A few hundred miles away, on the light side of the planet, the temperature would be that of molten lead, while the light and other radiation from the Sun would quickly prove fatal to any living matter.

"Good luck, Chris," the three astronauts called to their leader in turn, and Gail added hers from the couch.

"Thanks," the laconic reply came back. "I'm moving into the airlock now."

The helmeted figure of the leader moved forward to the airlock in the cabin wall. This was a semicircular compartment just large enough to admit one person at a time. Chris stepped inside and then raised his hand in a signal for the inner door to be shut. Serge swung it to and pulled the handle which would complete the airtight seal. A red light shone over the door, indicating that someone was inside the lock. The girl and the three astronauts watched the light intently. Suddenly it went out. They knew that Chris had opened the outer door and had stepped outside.

As the door of the airlock swung open, Chris looked out into a blackness more intense than anything he'd ever seen before. It was almost tangible. He switched on the light, from the top of his helmet, which shone like a miner's lamp.

The beam fell on a glistening black surface and Chris's first impression was that of an icefield. Right in front of the airlock door was a huge, towering mass that reflected the beam of light from myriad tiny points. Chris directed his beam down and saw that *Mercury I* was sitting on a tiny plateau. Around them were formidable mountain peaks that stood up menacingly. The astronaut let out a whistle of relief as he saw how fortunate their landing had been. A dozen yards or so either way would have brought the ship down on top of one of these fearsome peaks.

Then Chris looked up and saw light. It came from the countless stars that studded the planet's sky. Bright and unwinking they shone, and one among them was home, the Earth. For a few seconds he looked upward and then he began to climb down the ship's side carefully. His left foot touched something solid and the next second he was standing on the surface.

"I'm down," he called to his companions over the helmet radio, and then back came a torrent of questions about what he could see.

Before stepping away from the ship's side Chris, with the aid of his lamp, scanned the ground around him. His first impression was confirmed. *Mercury I* was indeed standing at an angle on a small sloping plateau not more than twenty yards square. He couldn't see what was beyond the plateau's edge in one direction, for his light failed to illuminate anything. This could only mean that there was a sudden sharp drop. In other directions Chris could see the towering masses he'd noticed when he had first opened the airlock door.

Chris described what he could see for the benefit of those still confined in the cabin. Now he would turn his attention to their ship to find out how it was standing and if there was much damage. From where he was standing he could see that *Mercury I* had settled squarely on its base, but because of the slope of the plateau it stood almost thirty degrees out of vertical. The casing seemed sound enough from this side. He'd try and walk all around the rocket to examine it from all sides.

He couldn't move! Chris tried to lift his foot to stride around the ship but it remained firmly stuck to the black glistening rock. He tried the other foot and it was the same. He was rooted to the spot!

Chris forced himself to remain calm and described his predicament to those inside lightheartedly. But he was puzzled and deeply concerned. If he couldn't move his feet how could he get back to the cabin? And if he couldn't get back to the cabin what would happen to him? Was he condemned to die just a yard from safety?

Again Chris tried to free his feet, but without success. It was as if he'd become frozen to the ground. Frozen? Perhaps that was it! Maybe the intense cold actually had caused the soles of his space shoes to stick to the freezing rock. It had never happened before, but then he'd never been in such a temperature before – come to think of it, he was feeling distinctly chilly. Was the cold creeping in through the protection of his spacesuit?

This won't do, Chris thought. If I cannot free myself, the others mustn't venture outside. Better for just one of us to be trapped.

He tried again to free himself, exerting all his strength. His great fear was that he would tear the soles off his boots, which would let out the pressure in his suit and allow the relentless cold to enter. It was the choice of two evils – either to remain trapped like a fly on a flypaper, or to risk damaging his suit with inevitable fatal consequences.

Suddenly one foot came free. Chris almost fell over as his boot came away from the rock. Fortunately no damage had been done, so he could concentrate on freeing the other. It wasn't easy, but at last he managed it, and by that time the first foot was showing distinct signs of sticking again.

I must keep moving, Chris thought, and he relayed this information to his companions inside the ship, who had been wondering what their leader was doing.

To test out his theory Chris didn't allow either foot to remain in contact with the surface for more than a few seconds. This seemed to prevent them from freezing to the surface. The exercise also helped to keep him warm.

With the aid of his lamp Chris, constantly moving one foot at a time, managed to walk all around *Mercury I*. There was one place where the casing seemed damaged. He must get Tony to have a closer look at it. Meanwhile he must get back to the warmth of the cabin, and it wouldn't be a moment too soon.

"I'm coming inside," Chris called over the radio. It was difficult to keep his teeth from chattering, for the cold was penetrating his suit more and more. It was as much as he could do to clamber up the side of the ship and seal himself inside the airlock.

At once he began to feel warmer. A few seconds later he'd whipped his helmet off inside the cabin and while Serge and Tony assisted him from his spacesuit, Chris described what he'd found outside.

"It's obvious we can't remain outside for very long. How long have I been out? Fifteen minutes? Then we'd better fix ten as the maximum. And we must all keep moving. I nearly became part of the landscape," he said.

"Who's next out?" asked Tony.

"You and Morrey can go out together. Maybe you can get a look at that hole in the casing," Chris said. "We must also decide if the ship requires any adjustment in its position for blast-off."

Already the two astronauts were preparing their suits for the excursion outside. They would concentrate on the task Chris had set them in the very brief time they could endure the cold. It was obvious that a better form of insulation or heating of spacesuits must be devised before there could be any extensive exploration of the cold side of the planet. All that the crew of *Mercury I* could do was to concentrate on survival during the preparation for their return – until the signal to push off came from Earth.

"Gail, let Control know what's happening," Chris said as Morrey and Tony completed their preparations. Even as the girl flashed her thoughts to her distant twin, first Tony and then Morrey disappeared through the airlock. Those still in the cabin could hear their exclamations. They could also hear Tony's running commentary as he scaled the side of the ship to look at the hole in the outer casing. Fortunately the inner shell hadn't been penetrated, otherwise the cabin's oxygen would have escaped. Nevertheless the hole would have to be repaired. Because of the constant impact of micrometeorites, it would be dangerous to leave the inner shell exposed to this hazard.

Morrey reported that some work would have to be done to make the ship safe for the take-off. Certain rocky obstructions would have to be removed. Otherwise the ship would scrape them as it lifted off the small plateau.

There was no need for Chris to recall the two members of his crew. The American and the mechanic were only too glad to return to the protection of the cabin after less than the alloted ten minutes. No actual work had been done, but both had made a fairly accurate assessment of what was required.

"The work will have to be done in short, sharp spells," Chris said with a sigh, for this was going to make the task of preparing for launching so much more difficult.

"Chris," Serge called out suddenly, "the cabin temperature has fallen two and a half degrees since we landed."

The leader whistled in dismay. It was evident that the intense cold outside was drawing out the ship's heat in spite of the insulation. Probably a large proportion of the loss was through that hole in the outer skin. For a time the batteries could make good the loss and restore the temperature. But this would mean a heavy drain on them and risk insufficient power for igniting the motor for launching. Oxygen pumps were also making a constant demand on the batteries which could no longer be recharged by the solar cells. Because they would have to remain for the rest of their stay in this utter blackness, the crew of *Mercury I* could receive no help from the Sun in recharging the batteries.

Every member of the crew realized the gravity of their position. Gail was suddenly aware of the gloomy atmosphere that had descended in the cabin. She could sense that they were worried about something, but they obviously didn't want her to know what it was. Faithfully she reported her impressions to her sister without Chris and the others being aware of it.

Sir George Benson received the information with considerable concern. The fall in temperature, coupled with only the very short spells that were possible outside the cabin, posed a very grave problem. Each time a member of the crew passed through the airlock, he would take with him a small but valuable amount of heat. Numerous passages through the lock would rob the cabin of a considerable amount of the warmth that was essential for the survival of the crew.

"It may be due to freezing or to a type of magnetism occurring at zero temperature," Mr. Gillanders observed, after studying the reports of Chris sticking to the rocks of Mercury.

"I rather fancy the freezing theory," Sir George said, "because magnetic attraction would be instantaneous and would not require a few seconds to become effective."

"You may be right," Billy answered, "but what can we do about the fall of cabin temperature?"

"Not much," Benson answered bleakly. "If it falls too low the crew will have to keep their suits on."

"But some of the instruments inside the cabin won't operate at zero temperature," the deputy pointed out.

"Let's see if the observatory boys have any news for us yet," Sir George said, reaching for his phone.

"No," the astronomers replied. "Though decreasing, the sunspot activity is still too much for the astronauts to venture from their place of shelter."

"I see," Benson said, beating an impatient tattoo on the table with his fingertips. "Please give us an hourly report. We must get the ship away as soon as possible."

"Will do," the astronomers promised, and with that Sir George had to be content. He sometimes wondered if the men, seated in their comfortable and warm observations, really understood the life and death struggles that took place on those distant worlds which they only watched from afar.

"How long?" Benson asked the astronomers.

"Minimum thirty-six hours, maximum a hundred and four hours," the cautious men at the other end of the phone informed him.

"Pass that on to *Mercury I*," Sir George told Gill. "Chris will prefer to know the best and the worst. Oh, and ask what the cabin temperature is now."

"Fallen another degree," the girl told him a few seconds later. "Chris says they're not making much progress with repairing the outer casing. They seem to be feeling the cold more. Tony could stay outside only eight minutes last time."

"How is the ship placed for the take-off?" Benson asked.

"They've managed to chip away a few of the projecting rocks," Gill reported, "but Chris says it's a tough job."

"Well, they can raid the emergency food supply if it will help," the Director told the girl.

Tony, whose job it was, had already spent eight periods outside the ship trying to put a patch over the jagged hole in the outer casing.

First he had to remove any rough pieces of metal so that the patch could be fitted snugly to casing. Then he had to shape the strip of alloy that he was using as a patch. It had to be the right size and shape to follow the contour of the ship. Because the metal of the casing and patch was extremely tough, it was a hard job. But Tony was a clever mechanic, and by the time his last excursion was over, he'd prepared everything for the final fixing.

"Better take a rest now," Chris suggested, seeing how exhausted Tony was by his efforts. In spite of the mechanic's protests the leader insisted, and secretly grateful, Tony went to his couch to sleep. It seemed that he'd hardly stretched himself out, before he felt someone shaking him violently.

"Wake up," Morrey was saying urgently. "The temperature's fallen again. We must all put on our spacesuits or we'll soon freeze to death."

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All the crew of *Mercury I* were suited except for their helmets. These would be worn later when the temperature fell still further. Meanwhile they could all speak to each other normally, a situation which all astronauts prefer. Communication by helmet radio wasn't as pleasant and it consumed valuable power.

Every breath of the crew produced a cloud of vapor – just as if they were out of doors on an icy day. Frost was beginning to form on some of the metal surfaces, and it had to be scraped off some of the instruments before they could be observed clearly.

The repairs outside the ship were being pressed forward as rapidly as the short work periods would permit. Tony was concentrating on the casing job, while the other three devoted their energies to clearing the ground for the launching.

Gail pleaded to be allowed outside the ship, but Chris refused. The girl was in no condition to face the freezing cold in spite of the training she'd had on Earth.

"Ready to – rivet the – patch into place. . . ." Tony gasped as he returned to the cabin. Though the cabin of the ship was becoming uncomfortably cold, it was still a relief to get inside.

"Can we help?" asked Serge and Chris, who were having a period of rest.

"No. I just want the riveting gun. Then I'll manage," Tony said.

He was referring to the ingenious instrument shaped like a pistol. But instead of firing bullets it fired rivets. Tony would hold the nozzle against the metal casing, press the trigger, and a rivet would be shot firmly in position.

By the time *Mercury I* was ready to blast off, conditions inside the cabin were becoming desperate. Soon after Tony had finished making a neat job of the patch, Chris gave the order for helmets to be worn constantly. The space ship seemed to be losing the last of its heat. Every possible source of warmth had been pressed into service and now the batteries were dangerously low. Any further demands on them might prevent the ignition of the chemical motor, their only means of escape.

"Find out if there's any news," Chris asked Gail over the radio. Faintly the girl's voice came back saying that she would, but it was some time before the crew heard her speak again. They were beginning to worry when her words came through:

"Sir George says – the astronomers – have – told him it – will be another – twelve hours," Gail said. "Oh, Chris, I can't take this. I'll have to take – the helmet – off."

"What's the matter with you, Gail?" Chris asked sharply.

"You know quite well you can't take your helmet off. If we have to wait only twelve hours it's not nearly so long as you've done in training."

"Sorry," the voice of Gail came back. "I'll manage."

Seems as if training has little effect on girls, Chris thought to himself. He wasn't able to voice his thoughts aloud, for Gail, as well as the other three members of his crew, would have heard him.

Twelve hours! That wasn't so bad. Surely they could manage to hold out for that length of time. They could do some exercises to promote circulation, but here, of course, the consumption of oxygen was a factor that had to be borne constantly in mind.

"Come on, everyone. Exercises!" the leader called over his radio.

Tony, Morrey, and Serge, like the well-trained men they were, obeyed at once, but Gail declared she couldn't do it. Chris knew that if the girl remained immobile on her couch the increasing cold would take away her senses and rob them of all contact with Earth. No amount of persuasion could get the girl to her feet. When Chris sternly ordered her to join them, she did make an effort to comply, but with a wail of despair she sank back helplessly on the couch. Chris could see that he'd have to be ruthless.

"Come on, Serge, grab her," he snapped.

The two astronauts took hold of the girl and in spite of the feeble protests coming from her over the radio they put her through a series of exercises.

"Feel a little warmer?" Chris asked as they let the exhausted girl sink back.

"Yes, but – I can't go on," the desperate reply came back. "I'm tired. Let me sleep."

Morrey and Serge caught each other's look through the windows of their helmets. They knew that, in the increasing cold, if the girl went to sleep she'd never wake up. Though their own movements were becoming more of an effort, with a muttered apology they dragged the unfortunate Gail from the couch once more.

"Tell Gill to try and help us keep you awake," Chris told her. He guessed that they would need all the help they could get to keep the girl conscious.

In turn the four astronauts walked Gail around and around the cabin. It was almost beyond them, for their own joints were stiffening and each felt his circulation becoming more sluggish. Several times Chris told Gail to speak to Control – ostensibly to ask if there was any change in the sunspot situation, but really to keep the girl's mind awake. The replies were not coming through easily, and twice Chris had to speak to her sharply to jerk her into wakefulness.

Now the astronauts were watching the chronometer anxiously. About another four hours Gail had said. It wouldn't be too soon, for though they would never admit it, each of the crew began to have doubts as to whether they would be able to keep going that long. Would Gail still be able to bring them the vital order? Could they themselves keep awake an additional four hours, let alone keep the girl from sleeping?

They had given up reading the instruments in the cabin. All their energy was now concentrated on keeping on the move, and every passing minute seemed to make the task harder. And even if they had wanted to watch the instruments, many of them would have been unreadable. All water vapor in the cabin atmosphere had been frozen out, and a thin layer of frost covered nearly every surface.

Maybe it was Gail, but it might have been Serge. The two of them, making an endless tour of the small cabin, stumbled and fell. The girl lay still, and Serge made only a feeble attempt to get up. Again Chris — his own energy almost gone — had to goad the Russian into struggling to his feet. Morrey took over the job of walking Gail around, but he was in little better shape than his Russian friend.

Chris was becoming desperate. Soon he'd have to risk pressing the frost-covered firing switch. Perhaps the radiation wouldn't be as bad as this slow freezing to death. Would the word from Control never come? An overpowering desire to sleep was creeping over him. He fought it with all the will-power he had left.

Tony was, perhaps, in the best shape of all. Several years younger than his companions, the nature of the mechanic's job kept him fit. Even he, however, felt a deadly lethargy creeping over him, so he insisted on taking more than his share of the work to keep Gail awake.

Sir George Benson was sitting by Gill Patrick's chair. His expression was one of extreme concern, for the girl had reported increasing difficulty in getting a response from her twin. The Director had an idea of what was happening, and he could picture the scene in the space ship's cabin as it grew increasingly colder. Because it had been impossible to test spacesuits at zero temperature, the ordeal of the four young men and the girl could not have been foreseen. Now it was evident that the insulation of the suits had been greatly reduced in the unique physical conditions encountered on the dark side of Mercury.

Gill was doing her utmost to assist the crew in keeping her sister awake. The poor girl was dreadfully worried at her twin's condition. Never had her sister's responses been so sluggish. It was as much as she could do to get a reply from Gail. She, herself, was showing signs of considerable strain, but Sir George continually encouraged her in her efforts.

It was difficult now for the Director to get a complete picture of happenings in *Mercury I*. Gail Patrick's messages were very sparse, and Benson had to deduce a great deal. He knew he couldn't tell exactly how the crew were faring, for everything was coming through from a girl in very bad shape. How much more Chris and the others would endure he could only guess at. If Gail should succumb to the cold, contact would be lost, and Chris would have to blast off on his own. Benson had every confidence in his young friend, but would he leave too late?

"Confound those wretched astronomers," Sir George grunted. It was as if he held them personally responsible for the sunspots and their effect upon the astronauts.

"Get the lastest situation report, Billy," he said.

Mr. Gillanders already had the phone in his hand. He spoke a few crisp words into the instrument and then listened for a few seconds to the reply before returning the instrument to its rest.

"Still looks good," he announced. "They say another couple of hours should be enough. No fresh spots have appeared, and the old ones have almost gone. If a spot turns up at the last moment, they'll phone us at once. Otherwise it will be safe for the ship to take off at about 0230 hours."

"Tell Gail. Tell her it won't be long now," Benson said urgently to Gill. The girl nodded silently and sent her thought winging across space.

"Have you told her?" Sir George asked anxiously.

"I don't know," confessed the girl; "she isn't sending anything back."

"Keep trying," Sir George insisted.

"It's no use, Chris," Tony gasped as he gave up his last despairing effort to keep Gail awake. He was so exhausted himself that he hadn't strength to support the girl any longer, and she slid to the floor of the cabin. Chris knew he couldn't help, and Serge and Morrey had already passed out.

"Let – see if – we can – get her on the couch," Chris said, fighting to make his jaws work in the intense cold.

By a superhuman effort the two astronauts just managed to get Gail onto her couch. Had they failed to do so, she would have had a miserable, possibly disastrous time when the great engines started up.

"What – do we do now – Chris?" Tony managed to ask over the radio.

"Hang on – as – long as possible, then we'll blast off," the voice of his leader answered.

Even the fronts of their helmets were beginning to be frosted. Soon they would be unable to see through them. Chris fixed his eyes on the firing switch to memorize its position – just in case. But when should he press it? How would he know what was the last possible moment? A few seconds too late and he mightn't be able to do it at all. And the switch. It was now white with frost.

Chris was so cold that his brain seemed numb. He couldn't remember whether they had to wait one hour or two. Neither could he quite remember what Control's last intelligible message had been. It was no use waiting any longer. Gail was completely out. He must decide when to take off. So he decided. *Now!*

"Going to – blast," he forced his jaws to say to Tony so the mechanic could get to his couch. Then he'd press the switch and leave their fate in the lap of the gods.

"Good," Tony's monosyllable came back.

Chris's brain, almost unable to think, ordered his arm and hand to press the firing switch.

Nothing happened. His limb didn't obey! He just couldn't move. He'd left it too late.

"Tony," he called out in near panic. "I'm – stuck. You – fire."

"Right," the voice came back, scarcely any stronger than his own. "Get down, Chris. I'll do – the launch."

With a sigh of relief the leader sank back. Everything depended on Tony now. If only they could escape this killing cold. Once they were out of Mercury's shadow, the solar cells would soon recharge the batteries. Then they would be able to thaw out.

Confidently Tony made his way toward the switch. He was surprised how difficult it was to move. He was stiffer than he'd expected to be. Still – he'd be able to do a little job like pressing that switch.

There it was. Any second now their troubles would be over. His fingers felt the switch. He pressed.

It refused to move.

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Desperately Tony tried again. It was no good. His strength had almost gone, and the switch was frozen. Again and again he tried. Still no result. The wretched switch wouldn't budge. Were they going to perish on that frozen planet just because he couldn't press a switch? Almost weeping with anxiety, Tony mustered all his ebbing strength to continue his futile efforts.

"It's – frozen – I can't do it – Chris," he moaned into his radio. But there was no reply from the leader. Believing he could leave the launching safely to his younger companion, Chris had at last slid into that frozen sleep from which he would never awaken – unless *Mercury I* could escape from that utter cold.

"What can I do?" Tony asked himself in agony. "All the others are unconscious – and I can't fire the motor!"

He staggered, distraught, around the cabin. Then suddenly his eyes rested on an object that gave him an idea. It was the rivet gun that he'd used to fix the patch on the casing outside. It was always kept loaded, the tiny cartridges ready to force rivets through metal sheets if the ship should suffer damage from the debris of space. If he could hold the gun against the switch and fire it, there was a possibility that the force of the explosion would move the switch. It was worth trying. Anything was better than remaining inactive while the last vestiges of their lives drained away.

Moving stiffly, Tony managed to take hold of the rivet gun. Walking like a rusty automaton, he approached the switch and held the nozzle against it. With thumping heart he tightened his finger against the trigger. Instantly he felt the kick of the gun as it discharged a rivet against the switch. Tony could have wept with relief as he saw that his idea had succeeded. The switch snapped over smartly. The firing sequence had begun. Five seconds later the floor of the cabin came up and struck Tony a sharp blow as the powerful motor snarled into life.

Never had the pressure of acceleration been more welcome. Uncomfortable though it was, Tony knew it meant that every second the ship was being carried farther from this hostile world. If — if only he could use the batteries to warm the cabin! Or if they could escape from the shadow of Mercury and bathe in the glare of the Sun!

Then Tony had an alarming thought. The timing apparatus had not been set to cut off the chemical motor when the desired velocity had been reached. Unless he could manage to switch it off manually, the motor would continue to thrust the ship forward until all the fuel was consumed. Then there would be none left for the landing back on Earth. He must switch off the motor. He must, somehow.

By a tremendous effort the young man managed to raise himself against the rocket's tremendous thrust. With a lurch he staggered against the switch and knocked it back. Immediately, as if by magic, the terrific acceleration disappeared and he was in free fall. Morrey and Chris, who hadn't secured their safety belts, floated limply above their couches. To prevent injury to them, Tony secured each in turn, though he was concerned to find how stiff their bodies were. Now he could set the timer and restart the motor.

It took just a few seconds to set the timing apparatus to give the motor a run of another sixty seconds. This was pure guesswork on Tony's part, for he had no means of knowing their velocity. The instruments were either not working or frosted over. Even if he could read the velocity, he wouldn't be able to calculate the best flight program. It would have to be a complete gamble, but the main thing was to get the ship moving without allowing it to run away.

How long would it be before *Mercury I* emerged from the shadow? Grateful for its shelter when escaping from the sunspot radiation, the ship must now escape from it as quickly as possible. When the motor died again, cut off by the timer, Tony felt he'd done all he possibly could for the moment. In a little while he'd switch on the heater so that as soon as the solar batteries began to operate the temperature would be raised.

Tony looked at each of his unconscious companions one by one. Their faces were pale and they seemed scarcely alive. There was nothing he could do for them until it was warm enough to remove their helmets. As he floated around the cabin Tony passed the radio. As an afterthought he switched it on so that as soon as the batteries began to operate it would send out a signal to let Control know they were still alive.

It was the thermometer that was now the center of Tony's interest. At its lowest the instrument had recorded a cabin temperature of minus 70 degrees centigrade before frosting over – an incredible condition that had never been anticipated. The first encouraging sign was that the thermometer was now readable again, even though it still registered minus 65 degrees centigrade.

Every few minutes the young mechanic studied the instrument anxiously. The batteries were not operating yet, but the temperature was slowly creeping up now that *Mercury I* was away from the planet's zero heat. Space, too, through which they were speeding, would not be so cold as the planet's dark side. But it wouldn't be until they were in full sunlight again that conditions in the cabin would revert to anything like normal.

Tony floated about restlessly, noting each temperature rise with relief. At one time he thought of trying to start the ion motor, but abandoned this difficult operation to await the help of his friends. Of course there would have to be a major alteration to their trajectory once Control could get all the information. Would Gail be able to transmit again when she recovered?

Temperature minus 40 degrees centigrade. Yes, it was going up nicely – no colder than many places on Earth. As he looked again at each of his companions, Tony wondered how long it would be before human beings were deliberately frozen for long voyages. When the breakout of the solar system came and man decided to cross the fantastic distances to the stars, it would be necessary to put the crew into cold storage. Even with the terrific speeds obtainable from the ion motor, the journey to the nearest star would take several years. Scientists believed that by freezing the crew they could save food, oxygen, and – above all – boredom. The crew would be automatically defrosted as the voyage neared its end. To them it would seem that the journey had been a very short one, for they would be unaware of the lapse of time during their period of suspended animation.

Several hours elapsed before Tony felt it safe to remove his own helmet first. The thermometer was still well below freezing point, but it would be a great relief to breathe the free air of the cabin once more. He'd wait another half hour or so, and then he'd remove the headgear of his comrades who were still unconscious.

Mercury I must have emerged from the shadow during this period, for the temperature started to rise very rapidly, showing that the batteries were now working. Carefully Tony removed one helmet after another. Then he watched them all anxiously.

Serge was the one to show the first signs of recovery. The Russian's face had become less pale and his breathing had become stronger. At last his eyes fluttered and opened. Tony had never heard a more welcome sound than his companion's groan. Thirty minutes later the other astronauts had recovered too, but Gail remained in a coma. The strange thing was, neither Chris, Serge, nor Morrey would believe they had been unconscious. Only the fact that *Mercury I* was on her way and that they were in free fall really convinced them.

Chris made a great effort to collect his thoughts.

"We must get through to Control," he said after Tony had given an account of how he'd managed the launching. "They'll have to give us a path as soon as possible. We may be heading right out of the solar system."

"I've already switched on the radio," Tony explained. "It should work now that the batteries are charging. Whether we can get through is another matter. Let's have a try."

It was no use. Try as he might, Tony could get nothing back from Earth. And there was no way of knowing whether Control was receiving their signal. As far as Sir George Benson knew they were still on the barren planet.

"We may as well start to get as much data as possible," Chris said. "Then it will be ready when Gail or the radio are operating. Serge, will you do some visual observations? Morrey, try the radio."

"Are we going to start the ion motor yet?" Tony asked when the other two had gone to their tasks.

"No use until I find in what direction we're heading. Maybe I can get a rough idea from Morrey's and Serge's observations. Unless we can get help from the computer at the Cape, I'll have to have a shot at it."

"Chris, look here!" Serge called out suddenly. He was peering through the telescope at something that had caught his attention.

The leader went across and the Russian moved away from the eyepiece so that Chris could take his place. He looked through for quite a while, naming in his mind the many celestial objects he could see. Then he stopped. There was one he could not name. He couldn't remember seeing it before. There could be no doubt that it was a planet.
Though small, it appeared larger than any of the familiar stars. Even as he watched it he could detect its movement against the star pattern behind.

It must be moving incredibly fast, much faster than any of the other planets. That could only mean one thing. It was nearer to the Sun than any of the other planets. So there *was* an inner planet nearer to the center of the solar system than Mercury. Scientists had long suspected but could never see it because of the Sun's glare. If the expedition had accomplished nothing else, it had definitely confirmed the existence of Vulcan, as it had been provisionally named. If only they could let Sir George know!

Chris moved away from the telescope and floated over to where Morrey was working. He collected the readings the American had made as he would be able to get a rough idea of their position from them. He must lose no time in fixing their position, for it might be many hours before they could get help from the Cape.

Meanwhile Tony was still trying to revive Gail. Several times he gave her whiffs of oxygen. She had lost the rigidity she'd had under the intense cold and her face and hands certainly felt a little warmer, but she needed urgent help. Tony decided that he must give her an injection of heart stimulant. Taking a hypodermic needle from the medicine cabinet, he drew in from a glass vial a small amount of a cloudy-looking liquid. He sought out a vein in the girl's arm and pushed the needle in. It worked. Ten minutes later Gail sat up and looked around.

"Where are we? What's happened?" she gasped as soon as she could speak.

Hearing her voice, all the crew gathered around her, for it was a great relief to know she was going to be all right.

"Take it easy, Gail," Morrey said. "We're on our way home."

"Yes, we blasted off from Mercury a short time ago. Actually we all passed out except Tony," Chris explained. "He managed to fire the motor, but I don't know yet in which direction we're going.

"Is – is everything all right?" the girl asked.

"Just fine," Morrey assured her. "All we want now is to get a flight path worked out and we're on our way."

"We're in free fall?" she asked, noticing her companions floating about.

"Yes," Serge told her. "We haven't yet started up the ion motor. We want to know first where we're headed."

"Can you speak to Gill?" asked Chris. "The radio isn't working and I'd like to let the Cape know we're all right."

"And we'd like them to tell us where we are," said Morrey, grinning.

"That's true," Chris admitted. "I'm working out a rough position but I can't claim to be a match for the computer."

"I'll try," Gail agreed.

They saw her close her eyes in concentration. After a time she opened them again, almost weeping.

"It's no use," she wailed. "I don't seem to be able to get through. I can't get Gill at all."

"Whew! We *are* in a mess – no radio, no telepathy," Tony said ruefully.

"Don't worry, Gail," Chris reassured her. "Even if you don't get through, we'll manage. But keep trying and let me know if you manage it."

The leader, disappointed that this novel means of communication had failed, went back to his complicated calculations. He reflected on how much easier it is to work out a position on Earth. They have only two dimensions to worry about there, whereas here there were three, to say nothing of the fact that the course was made more difficult by the motions and attractions of the Sun and planets.

"Right," Chris said at last to his companions, "this is what I've worked out."

He explained the result of his calculations to the other three astronauts. Because the fast moving Mercury had carried them some distance around its orbit, they were probably heading well away from Earth. It would be necessary to make a wide angle correction, and the sooner this was done the better. One anxiety for Chris was the amount of life left in the lateral rockets. They had already been used more than had ever been expected. Would they have enough fuel left to complete this essential maneuver?

Everything went well. They had no trouble in swinging the ship around in the wide arc that would head them homeward.

"Now we can start up the ion drive." And Chris breathed with relief after the change of direction had been completed to his satisfaction.

"Good," exclaimed Serge. The crew knew that the sooner the ship was under the steady thrust of the atomic motor, the sooner would they build up the high velocity that would carry them home.

"Any luck, Gail?" Chris called across to the girl.

"No," she answered despondently, "it's no use."

"Radio still dead, Morrey?"

" 'Fraid so," the American replied.

"Then we must manage somehow," Chris declared confidently, and his courage warmed the hearts of the other four.

Now, for the first time, the crew could relax and think about food. How tired and hungry they were! Gratefully they flung themselves on their couches and ate and drank. Even Gail felt more cheerful, although she was alarmed and puzzled by her inability to communicate with her sister, a faculty she'd had as long as she could remember.

As usual it was Morrey who was most sympathetic.

"Don't worry," he said reassuringly. "We're on the way home and everything will be fine."

Gail responded to his encouragement and felt happier. How could she know that another crisis loomed ahead with dangers no one could have foreseen?

19

"Hey! Look at this!"

One of the scientists at the Cape Kennedy Control suddenly let out a yell. He was crouched over the screen of a very sensitive radar set that was focused on the planet Mercury. Ever since the last message had been received from Chris a constant watch had been kept on the instrument to discover any sign that the space ship still existed. Just as important, Control would want to know if and when the space ship got away from the planet. Every minute, every second, eyes had been glued to the glass screen in the hope that it would reveal signs that the astronauts were still alive.

At the scientist's cry, Bill Gillanders hurried across. He was followed by other men who could leave their instruments for a few moments. They crowded around the instrument, and the man in charge pointed to a speck of light which had separated itself from the disc of the planet.

"Could be," Mr. Gillanders said; "or it could be an unmanned probe."

"No sir," one of the men interrupted. "We've plotted the orbits of all the known pieces of ironmongery in this sector. This doesn't seem to be one of them."

Tensely the little group stared at the screen, all of them fervently hoping that the speck of light was caused by the space ship *Mercury I.* If it was, then there was reason to hope that all was well aboard. For the next few hours the radar set was the center of attraction in Control. At last everyone agreed that *Mercury I* was in flight once more.

"We must work out their trajectory," Sir George Benson declared. He was greatly relieved by the good news, for he'd been terribly worried about the safety of his friends since all communication had broken down.

"Chris must have taken off by guesswork," Billy Gillanders declared. "We couldn't give him the all clear, but the launching seems to have been just about right. The Sun is free from spots, but how long it will be clear is anyone's guess."

"Let's hope the ship is well on its way home before there's another flare-up," Sir George said fervently.

"The ship has changed course."

The information from Control was very welcome. It showed beyond a doubt that although they couldn't speak with them, the crew of *Mercury I* was in full control of the vessel. It also showed that they must be aware of their position and had deliberately altered course to put them on a path back to Earth.

"Carry on the plotting of their path," Benson instructed. "We may find they'll have to change again, so we'll be ready for them when Gill or the radio gets through."

Gill Patrick had almost given up hope of communicating with her sister. Try as she might she could neither send nor receive thoughts. For one terrible moment she thought her twin must be dead, but for some reason this fear soon passed and she knew it wasn't true. Yet the power of communication, that uncanny gift of telepathy, seemed to have broken down.

"Keep trying," Sir George Benson urged, but it was very exhausting, and most distressing.

There was an air of gaiety in the cabin of *Mercury I*. After the deadly cold of the little planet, the five young people were feeling comfortably warm. They had eaten and had a good rest. The ship was taking them home at an ever faster speed. If only they could be sure they were on the best route back to Earth. Chris wouldn't be far out in his calculations, but even a slight error could make a difference of hundreds of thousands of miles by the time they reached the vicinity of Earth's orbit.

"Any luck with the radio?" Chris asked. Tony shrugged his shoulders.

"How about you, Gail?"

"Not yet, Chris," the girl answered as cheerfully as she could. But it was a terrible feeling not to be able to communicate with her sister.

The leader was writing up his logbook when the first crackle of the radio sounded. Though it was a horrible noise that sounded like a fireworks display mingled with the cries of an animal in pain, to the crew it was sweet music.

"It won't be long now!" Morrey cried optimistically. "We'll soon be picking up those fellows at the Cape."

"Don't get too carried away," Chris cautioned. "It may be some time yet before we can get intelligible two-way conversation."

While her friends were exchanging cheerful banter, Gail felt very depressed. When the crew most needed her help she had failed them. If the radio was coming back into operation her usefulness would end. She was nothing but a passenger and a pretty helpless one at that. Why was it, she wondered, that the bond between her and her twin had been broken? She felt reasonably well, and she had no doubt that her sister was well, too. Something must have happened to her while she was unconscious to snap the link that had always existed between them.

Chris continued writing his report in the logbook. It was his duty to record everything that had happened. Even though he would make a vocal record on tape, this written report was very important. It was highly confidential and could include items which he wouldn't care to mention on the tape in case his companions overheard.

"Report on Gail Patrick," he wrote at the head of a fresh page. He paused, for he did not much like what he had to do. He really liked the girl, but his report must be factual and unbiased. It was his duty to record faithfully without any distortion due to his own feelings. He must assess honestly how Gail had fared; how she had stood up to the stresses of travel in space; what her relations had been with her fellow astronauts.

"Gail has been a pleasant member of the crew," he wrote. "Her functions were limited to telepathic communication, and she has not been required to assist in the navigation of the ship or the recording of data. As far as telepathy goes, she has demonstrated its possibilities and limitations. Being instantaneous, it could be of importance on really deep space probes. On the present expedition the advantage over the slower radio has been marginal. No situation has arisen where the resultant saving of time was important. However, the telepathic contact continued after radio contact had been broken by conditions in space.

"I regret to have to report unfavorably on Gail's physical performance," Chris wrote on. "She does not seem to have benefited from her training. Although she seemed to be well prepared by the course at Farnborough, she has, in fact, lost the physical tone that had been built up. Indeed, at times I have wondered if her preflight training hasn't been completely wasted."

Chris closed the log book and slipped it into its case. He felt unhappy that he had found it necessary to criticize the girl so severely. But what else could he do? He wasn't opposed in principle to girls as members of space crews. Russia had proved that they could successfully undertake limited voyages. But on a fairly lengthy journey like the present one, it seemed that training couldn't toughen them enough.

Feeling a little guilty Chris went over to where Gail was lying on her couch.

"How do you feel?" he asked her.

"Not too bad," the girl answered with a forced smile. "But I hate not being of any use. I must say I'll really be glad when we're safely back on Earth."

"Don't worry," Chris assured her, "we're well on our way."

But were they? If only he could get into touch with Control! Perhaps the radio would soon give up that awful crackling and bring them a human voice.

It was almost as if Chris's thoughts had some magical quality, for at that precise moment the loudspeaker did bring them a few precious words.

". . . calling *Mercury I*. Are you. . . ."

That was all, but it was enough. The crew went wild with delight. How good it was to hear someone speak! It made them feel that they were no longer alone in space. Although they had heard only a few words they were enough to tell them that Control was making every effort to reach them. Serge spoke into the microphone and kept repeating that a few words had come through.

While the rest of the crew awaited impatiently for the next radio message, Gail lay on her couch, quiet and gloomy. She had even given up trying to speak to her sister. What was the use? she thought. What was the use of anything?

In Control, too, there was excitement as a few of Serge's words were picked up. Sir George Benson himself took over the microphone and kept repeating a greeting to the returning astronauts. Some fifty minutes later conversation was almost back to normal, and Control was able to request and receive exact data about the ship's position. The giant computer was set to work to plot the vehicle's best route home.

Suddenly, a hideous blare came from the great electronic machine. It was a signal that there was an emergency, that the computer had detected something seriously wrong. There was a rush toward the apparatus.

"What is it?" snapped Benson to the men in charge.

"A collision course!" one of them blurted out, "the ship is on a collision course with 64A-81."

The Director and his colleagues gasped. Here was something they had never expected. For years large numbers of satellites and deep space probes had been launched for various scientific purposes. Records were kept of several thousands of these bodies, for it was essential to keep track of just where each one was at all times. The computer at the Cape Kennedy Control had the details of all these orbits stored in its memory. It had now called attention to the fact that on its present trajectory *Mercury I* would collide with one of these man-made objects.

"When?" Benson demanded, the question coming out like a crack of a whip.

"In three minutes, fifty-seven seconds," he was told.

Sir George was stunned. Less than four minutes – and it took nearly five minutes for a radio signal to reach the ship! He beat his fists on the table in despair. What could he do? How could he warn the crew that they must change course immediately? He raced back into the room where Gill sat in her chair wondering what was happening.

"Try and get Gail," he snapped. "Try as you've never tried before. Tell them to change direction at once. They're on a collision course."

It didn't matter what direction *Mercury I* went as long as it was different from its present one. If Gill failed to get through, her sister and the four young men would die before a radio message could reach them.

"Change course, change course at once," Gill called out in an agony of concentration. In her supreme effort to contact her twin, she was unaware that she'd spoken her thoughts aloud. A few yards away, in the main Control room, a radio operator was speaking urgently into his microphone – a futile undertaking, for by the time his message reached the space ship it would be too late.

"Change course at once, you're going to hit something."

The perspiration sprang out in huge beads on Gill's forehead as she moaned and writhed in a last desperate effort to contact her doomed sister.

Chris listened to Serge informing the Cape about conditions in the cabin. He'd already sent all the information necessary for the ship's course to be checked. Even now it would be winging its way, at the speed of light, across those millions of miles to Mother Earth. He wanted very much to know how accurate his own calculations had been. Not that he expected that *Mercury I* would be spot on course, but he'd be surprised if any major change in their flight path was called for.

While he was waiting for Control's instructions to come through, Chris could relax and look around at his companions. Serge was still speaking quietly into the radio. What a good reliable friend the Russian had turned out to be. Thank goodness he'd had the sense to meet him halfway when, many years before, the two had been rivals. Serge's response had been such that nothing could now break the bond that held them together.

Morrey always sang a pop song when he was happy and things were going well. The cheerful American was busy with his recording instruments and a meaningless jumble of words came pouring tunelessly from his lips. This was singing, he would tell you if you protested at his efforts.

Chris could remember when Tony was still a schoolboy and he had persuaded him that even though he might not be cut out to be a high-powered scientist, he could still fulfill a vital role in the space effort if he concentrated on becoming a fine mechanic. Tony had followed his friend's advice, and now there was no one in any space crew who knew his ship inside out as Tony did.

The astronaut turned to look at the remaining member of his crew. In spite of what he'd written in his report he liked the girl immensely. What a pity she seemed to have lost that amazing power to communicate across vast distances. He was hoping he could at least have reported that the telepathy had been reliable. She seemed to be feeling the loss pretty badly, too. Her face looked very strained after the efforts she'd been making.

Then, even as he watched, the color drained from Gail's face and, for a moment, it was contorted so that he couldn't recognize her. Her mouth worked as if she was having difficulty in forming some words she wanted to say. Chris started toward her in alarm, but before he could reach her, she had uttered her message in a strangled voice.

"Change course. Change course at once," the words came out. "You're going to hit something!"

20

In a flash Chris flung himself at the lateral rockets and fired the first he could reach. His action was instinctive, unthinking. There'd been something about Gail that had convinced him her words were a message from Control. Everyone in the cabin but Gail fell to the floor as the ship twisted sideways.

"What's happened?" gasped Morrey, who'd given his head quite a whack.

"Don't know," answered Chris, picking himself up from the cabin floor. "Gail said to change course. I couldn't risk ignoring her. It may be from Control."

The four astronauts went across to where the girl was still secured to her couch. Her face was a picture of happiness and relief. To Gail it was just wonderful that she and her sister had broken down the temporary barrier that had suddenly come between them. Obviously she was making up for lost time in the communication with her twin.

"Sorry to break in, Gail," Chris said, "but that order was from Control, wasn't it?"

"Oh yes, Chris," the girl replied happily. "Isn't it wonderful that we can speak together again? Yes it was from Sir George. It was so urgent that, somehow, it got through. What shall I reply?"

"Oh – er – tell him we've changed course, but I haven't the faintest idea where we're going," Chris answered.

"Will do," the girl said cheerfully, and she relapsed into that precious state of communication with her sister.

"Whew!" breathed Morrey a few moments later. The frantic radio message had come through, confirming that Gail's desperate cry had indeed been a warning from Control. Before a radio answer could be sent, Sir George, weak with relief, had heard from Gill that *Mercury I* was out of danger. The astronauts looked at each other, a queasy feeling in their stomachs when they heard how close they'd been to disaster. Gail's presence had saved them. Of that there could be no doubt.

Chris made a mental note to amend his report.

Mercury I, now on a computer-dictated course, was streaking back to Earth. In the cabin the five people were becoming increasingly excited. Though they had experienced many homecomings before, Chris and his three male companions felt that there was something special about this one. The whole project had been unusual – having a girl with them, approaching close to the Sun, finding a new planet, depending on telepathy, and discovering to their cost the harmful effect of sunspot radiation. Soon the voyage would be over, the mission accomplished, the ship and crew safely back on Earth. Little wonder that they were all feeling a little intoxicated with relief.

All except Gail. While she tried to appear as carefree as her male companions, the girl knew she had another ordeal to face – one which she dreaded more than she could say. She was certainly happy that her telepathy had been so completely vindicated, but she was really scared about the ship's landing.

"How long shall we be now?" she asked her friends.

"Just less than twenty-four hours," Serge told her. "This time tomorrow we'll all be at the Cape."

While the four young men eagerly discussed what they would do and the meal they would have on landing, the girl felt her fears increasing. She knew that she wasn't in good enough condition to withstand the terrific strains of deceleration. Though she longed to be back on Earth and to be with her sister, she dreaded the landing operation.

"Cheer up, Gail," Morrey told her. "Anyone would think you didn't want to go home."

Were her fears as obvious as all that? the girl wondered. She must try desperately not to let her companions guess her secret.

"Well, one thing I won't like when we get home is that Gill and I will have to go back to Chislehurst. We'll miss you four terribly," the girl said truthfully.

"Ah, you don't shake us off as easily as that," Morrey assured her. "We'll be looking you up far too often for your liking – and who knows? – maybe we'll go on another trip together."

That's hardly likely, thought Chris, who'd heard the conversation. Gail can't be properly conditioned for space flight.

"Come and look here," called Tony from the telescope. "I've got Earth in sight."

The astronauts took eager turns at the eyepiece. Never had Earth looked more beautiful to them. It shone like a green jewel against a jet-black background. The seas and continents were plainly visible.

"Yippee!" yelled the irrepressible Morrey. "It sure looks good to me! Hey, Serge. What about doing a Russian dance in celebration?"

But the smiling Russian excused himself. He was as glad as anyone to be on the last stage of this hazardous voyage, but he was too reserved to let himself go.

"All right. Then Tony and I will," the exuberant American declared.

And so they did. The two whirled and staggered about under the low gravity of the atomic motor's gentle thrust. In the end Chris had to call a halt and order them, with mock severity, to get back to their jobs.

"How are they doing?" Sir George Benson asked.

He'd just returned from a brief spell off duty. The Director of UNEXA had not permitted himself to relax until he was sure that *Mercury I* was safely on its way home. Although urged to get some rest by Mr. Gillanders and the other scientists, Sir George would not leave Control while a special flight was in progress. His close attachment to this particular crew had kept him on duty even longer than usual. With everything going well, he'd been away to get some sleep and a bath, returning much refreshed to supervise the final stage of the Mercury expedition.

"Right on course," Billy Gillanders told his chief. "The touchdown should be in eight hours, twenty minutes."

"Good. Now off you go, Billy. I'll have you called a couple of hours before the landing."

"Righto, Chief," the Deputy yawned. "I think it's quite straightforward now."

The big Australian handed over his notes and, after a few jocular exchanges with some of the men at the instrument panels, went off duty. Sir George bustled around the room personally looking at each piece of apparatus and exchanging a few words with the men in charge. He returned to his table in the center, well satisfied that *Mercury I* was on course and functioning perfectly.

As the radio time lag was now only fifteen seconds most of the communication was sent that way. However, Sir George did make occasional use of the "other channel," giving Gill a few short messages to transmit to her sister. On the whole he left the girls very much alone so that they could chat together.

Excitement was growing at the Cape. The newsmen were congregating; the television and newsreel cameras were jockeying for position around the landing area. Reporters were giving minute by minute reports of the event at Cape Kennedy. The World watched and listened for the expedition's return.

It was planned that the ship, having been sufficiently decelerated by the ion and chemical motors, should go into orbit about four hundred miles high. There it would make a complete circle of the Earth while its path was computed with absolute exactitude. A signal would be sent for a burst from the chemical motor to break the orbit and to further reduce the ship's velocity. As it entered the outer atmosphere, at an altitude of about thirty-five miles, a small parachute would be ejected from the nose. This would slow the ship down even more. Then ten miles up, a much larger parachute would float out. If all went well the ship and its crew should be deposited gently and safely in the landing area just a few miles from the place where they had blasted off.

The Patrick girl was longing to see her sister again. She had become a great favorite with the scientists in Control. As she hobbled about the huge room, her aluminum crutches clanking metallically, she exchanged excited greetings with her new friends. She'd never before been separated from her twin for so long, and though they had been almost constantly in mental contact, it was nothing like seeing her sister in the flesh. Besides, she knew that Gail was apprehensive of the landing ordeal, and for her sake she hoped it would soon be over.

"Fine!" exclaimed Sir George as he pored over the latest readings of the space ship's position. "Scarcely anything can go wrong now."

The ship was a mere forty-five thousand miles away, and its velocity had been falling nicely. Reports from the crew said that all was well in the cabin, and advance orders were placed for the meals they would have as a change from their dull space diet. When Gail was asked what she would like the girl was too moved to reply.

"On to your couches, everyone," Chris called. Soon he would fire the chemical motor that would give them terrific deceleration. Their velocity would be cut from forty-three thousand miles an hour to eighteen thousand in just over two minutes. It would be extremely uncomfortable, but they had been trained to endure this.

"In fifteen seconds from – now," the voice from Control said.

The crew watched the second hand of the chronometer as it crept around the dial. Chris's finger was poised over the switch, his eyes glued to the time. Gail lay tensely on her couch, her eyes closed awaiting the dreaded moment.

With a swift movement Chris pressed the switch, and at once the kick came. Maybe it was because they had all been under conditions of zero or low gravity for some time and their muscles had become flabby, that the thrust of the rocket motor seemed more fierce. The experienced astronauts found it barely tolerable, but the girl passed out at once. At the correct moment the motor cut out and *Mercury I* began its long glide down to Earth.

"See what you can do for Gail, Tony," Chris said as they released themselves from their couches to start their final tasks.

"All right," Tony replied, "but we seem to spend half our time trying to revive her."

"I know," sighed the leader, "but it just means that you can't prepare and train girls as you can men."

The fleet of helicopters was already airborne. Scores of ships patrolled the sea around the Cape. The bowls of the tracking telescopes probed the sky with invisible fingers. A dozen pairs of eyes watched the telltale blip on the main radar screen. Sir George Benson paced the Control room, pausing each time he passed the radar. Billy Gillanders, back on duty long before he should, sat at the Director's table with a microphone in his hand. He was talking to the pilots and captains who were dispersed over a wide area waiting for *Mercury I* to appear.

Outside the main building stood another 'copter, its arms gently turning. Inside, almost weeping with excitement, was the earthbound Patrick twin. Sir George had promised that she should greet her sister just as soon as she could get there. The moment the parachutes were sighted Sir George would hurry out to join the girl and together they would speed toward the probable landing area.

"There she is!" someone yelled suddenly. One of the many telescopes had picked up the small parachute soon after it was ejected from the ship. Immediately every available optical aid was turned in the direction indicated. Some rapid calculations, allowing for wind currents at various altitudes, gave the approximate point of impact.

"Won't be long now," Benson said to the Patrick girl as their helicopter rose from the ground.

It wasn't. The landing went like clockwork, and *Mercury I* landed a little more than a mile from the estimated spot. In a few seconds a swarm of helicopters were settling down all around it. Cameras raced, commentators gabbled, everyone waited for the cabin door to open and for the astronauts to appear. A rousing cheer went up as the door swung back and the figure of Chris Godfrey stood proudly in the opening.

One by one the crew climbed out of the faithful ship that had carried them so near the Sun and had brought them back safely. At a word from Chris several men entered the cabin and reappeared with the girl on a stretcher. With a cry the two sisters were reunited, and it was some minutes before everyone was calm enough to start the journey back to Control.

"Leave your logbook over there. Let's just have a look at you all," Sir George said to Chris and the others. "Plenty of time for official reports later."

He had greeted the space ship's crew warmly as soon as they had managed to avoid the crush, and reached the calm of his office. There was so much he wanted to ask, but the main thing was that his friends were safe. A doctor had told him that though the girl wasn't in very good shape, a few days would see her fit again. Now the twins were sitting side by side as the Director and Mr. Gillanders chatted with the returned space travelers.

First Chris and then Serge and Morrey gave a brief sketch of their impression of the voyage, and the exciting discovery of the planet Vulcan, with Tony constantly interrupting with his own contributions. Benson listened with a smile. He knew that this was the safest way for the astronauts to unwind after the tension they had borne during the voyage. "Let them talk as much as they want," was his motto, for he knew what stresses had been building up inside each one. Though they themselves were not aware of it, the crew needed this outlet for the pent-up pressures inside.

"We were all tremendously excited about the new planet," Sir George informed his friends. "It has caused quite a furore among the astronomers. And I'm rather glad you found it for you'll soon be running out of solar planets to visit. You've been to half of them already," he concluded with a smile.

Suddenly Chris called a halt to his crew's babble.

"Gail has been very quiet," he said. "Let's give her a turn."

They all turned toward where the girl, still a little pale, sat with her twin. Both girls flushed at this sudden attention and for a moment seemed unable to speak. Then it was the girl with her leg in a cast who spoke.

"We think the boys have done all the talking," she smiled, "so there's only one thing my sister wants to say."

"What's that?" Sir George and the crew asked in a chorus.

"Oh – merely that she's Gill and I'm Gail," the girl with the broken leg said offhandedly. To prove it, both girls lifted up a lock of hair. Sure enough the twin who'd been to Mercury had freckles – and the other had none.

There was an astounded silence in the room which was at last broken by Sir George.

"Well – what –" he began.

"It was Gail that broke her leg," Gill said quickly. "We knew this would mean upsetting all your plans, so I said I'd go in her place."

"But you hadn't been trained!" Benson gasped.

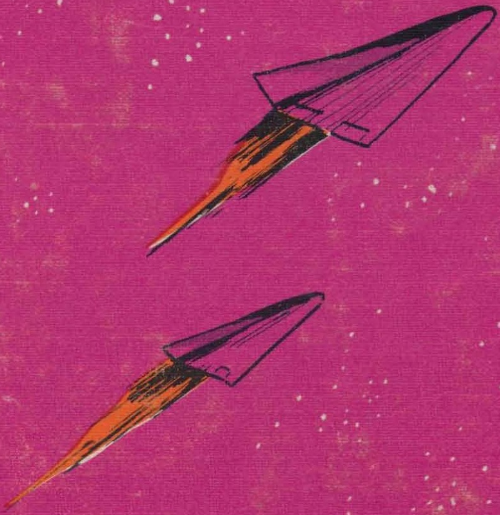
"I know," Gill answered softly. "I just did the best I could."

This time Sir George Benson and Mr. Gillanders joined in the verbal turmoil until suddenly Chris broke away.

"Where are you off to?" asked the excited Morrey.

Chris swallowed hard.

"Oh – er – just to change one page of my log," he replied.



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